CURRICULUM VITAE

LEONARD A. FERRARI
Professor Emeritus, ECE
University of California
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Current Positions: Research Professor, CSE, UCSC
CITRIS Center and Banatao Institute
UC Santa Cruz, Santa Cruz, 95064

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UC Santa Cruz, Eng 2
1156 High St, Santa Cruz, CA 95064

Citizenship: United States

Education:

1974-80   Ph.D. in E.E., University of California, Irvine. Research related to spatially varying digital filters; development of efficient recursive algorithms for the implementation of some classes of one- and two-dimensional filters. Dissertation title: "Recursive Binary Valued Image Filters."

1964-67   M.S.E.E. Northeastern University, Boston, MA

1959-63   B.S.E.E. Massachusetts Institute of Technology, Cambridge, MA

Academic/Research Appointments:

2016-Pres.   UC Santa Cruz, CE Department:

1. Professor NPS: On Sabbatical Feb 2016-2017
   CITRIS Center
   Baskin School of Engineering, UC Santa Cruz
   Completed Sabbatical Report on ONRG task assignments,
   NATO IST Panel Activities, International Conference
   Organization and Data Compression Research

2. Research Professor, CE, UCSC
CITRIS Center - UC Santa Cruz
Currently conducting research on computationally efficient methods for data compression and smart sampling for Internet, Cell Phone and WiFi video applications. Research proposals in progress.

2013-2017 Professor, ECE, Naval Postgraduate School and

Associate Director for Information Systems, ONRG: Responsible for the award and oversight of thirty research grants and twenty-five international conferences throughout Europe, for the Office of Naval Research in its international division, while based in London, UK

2013-2017 USA Voting Member: NATO CSO Information Systems Technology Panel (IST): Responsible for USA participation in IST Panel activities and the appointment of USA researchers as participants.

2006-2012 Executive Vice President and Provost, Naval Postgraduate School: Responsible for all Academic Programs and Outreach. NPS grew from a $120M/year to a $400M program during this period.

2006-2007 Acting President and Provost
Naval Postgraduate School, Monterey, CA, 93943

2003-2006 Associate Provost and Dean of Research
Naval Postgraduate School
Monterey, CA, 93943

2000-2003 Special Assistant, Governor's Office, Commonwealth of Virginia: Responsible for development of statewide collaborative research programs combining universities, corporations and government laboratories (appointed by Governor Mark Warner, while also serving as Vice Provost at Virginia Tech)

2000-2003 Vice Provost for Special Initiatives
Senior Fellow for Engineering, Physical Sciences and Information Technology
Executive Director, Institute for Information Technology
American Electric Power Professor of Electrical and Computer Engineering, Virginia Polytechnic Institute & State University, Blacksburg, VA 24061

1995-2000   Professor and Department Head
            The Bradley Department of Electrical and Computer Engineering
            Virginia Polytechnic Institute & State University
            Blacksburg, VA 24061

1997-2001   Advisor to the Dean of Engineering
            Hong Kong Polytechnic University, Hong Kong, SAR, China

1994-1995   University of California, Irvine: Associate Dean for Research and
            Graduate Studies, School of Engineering

1993-1995   University of California, Irvine: Professor of Electrical and Computer
            Engineering; Information and Computer Science; and Radiological
            Sciences (Awarded Professor Emeritus in 1995)

1994-1997   Kings College, London: Professor of Medical Science and
            Engineering (joint/visiting)

1990-1993   University of California, Irvine: Professor & Chair of Electrical and
            Computer Engineering

1987-90   University of California, Irvine: Associate Professor of Electrical
            and Computer Engineering and Radiological Sciences

1985-87   University of California, Irvine: Assistant Professor of Electrical
            Engineering and
            Radiological Sciences

1983-84   University of California, Irvine, Department of Electrical
            Engineering: Lecturer

1984-85   University of California, Irvine, Department of Radiological
            Sciences: Associate Researcher

1982-84   University of California, Irvine, Department of Radiological
            Sciences: Associate Clinical Professor

            University of California, Irvine, Department of Radiological
            Sciences: Senior Development Engineer responsible for leading
            the development of new ultrasound imaging and tissue
            characterization techniques

1974-75   University of California, Irvine: Teaching Assistant

1968   Northeastern University, Boston Massachusetts: Lecturer

Consulting Activities:

1987-88   Western Digital Corporation

1986-88   U.S. Navy Research Laboratory, NRPDC, San Diego, CA 92152

1990-95   Partnership 2010, County of Orange, California: Appointed by the
            Chancellor, UC Irvine

1990-95   Southern California Consortium for Engineering Manufacturing
            Education California State University, Long Beach

Honors:

2012   Congressionally Recognized *Ellis Island Medal of Honor*

1997   Fellow, IEEE: For contributions to engineering education and
            research in signal and image processing

1990-93   Unocal Foundation Research Award

1989-90   University of California, Irvine: School of Engineering Outstanding
            Research Award

1981-84   National Research Award: Fellow, National Institute of General
            Medical Sciences (NIH)

Professional Association Memberships:

            Life Fellow, IEEE
            Member, SIAM
            Member, AAAS
            Member, MAA
            Member, ACM

Selected Professional Service and Activities:

2000-2003   Member, State of Virginia, CIT Information Technology Steering
            Council

1997-2003   Member, New River Valley Economic Development Council,
            Virginia

1997-99   Director of Operations, Virginia Microelectronics Consortium (VMEC): Created by the State of Virginia as a University/Industry Partnership

1996-97   Chair of the Advisory Committee, 30th Acoustical Imaging Symposium, Boston, MA

1995   Advisory and Program Committee, 29th Acoustical Imaging Symposium, Florence, Italy

1995-2003   Associate Editor, IEEE Transactions on Video Technology

1993   Conference Committee: Acoustical Imaging Conference, March 27-30, Laguna Beach, CA

1993   Co-Chair, Conference Committee: IFIP Conference on Visualization in Scientific Computing: Uses in University Education (July 28-30, 1993) U. C. Irvine, Irvine, CA

1992-95   UC Irvine Representative on Partnership 2010, Orange County Development

1990   General Chair, SPIE Conference on Curves and Surfaces in Computer Vision and Graphics, Santa Clara, CA, Feb 13-15

1989   Session Chair, 24th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov 5-7, 1989

1988-99   Area Editor, Machine Vision and Applications, Springer-Verlag

1988   Conference Committee, 18th International Symposium on Acoustical Imaging

1988   Session Chair, 22nd Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Oct 31-Nov 2

1988   Program Committee, Medical Imaging II, Newport Beach, CA, Jan 31-Feb 5

1987-92   Steering Committee, Asilomar Conferences on Signals, Systems and Computers

1987   Conference Committee, 21st Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, Nov 2-4

1987   General Chair, International Symposium on Pattern Recognition and Acoustical Imaging, Newport Beach, CA, Feb 4-6

1987   Program Committee, Medical Imaging, Newport Beach, CA, Feb

Journal Reviewer:

IEEE Transactions on UFFC
IEEE Transactions on BME
IEEE Transactions on ASSP
IEEE Transactions on Circuits and Systems
Ultrasonic Imaging

Funding Agency Reviewer:

National Science Foundation
UC Micro Program
PATH Program

Ph.D. students:

Electrical Engineering:

Skidmore, Roger, Co-Advisor with Dr. Ted Rappaport, passed Qualifier 2002

Park, Jae, "Automatic Data Fitting Using Spline Functions," Ph.D. awarded December 1999

Refling, J., "Pipelined Implementation of B-splines and Beta-splines for Computer Graphics and other Discrete Applications," Ph.D. awarded 1993

Wang, S-Y, "High-speed, Interactive Computer Graphics Using Spline functions," Ph.D. awarded 1991

Pang, Dashan, "A Unified Approach to IFIR Filter Design Using B-Spline Functions," Ph.D. awarded 1990

Harashima, M., "Kalman Filter Applications to Time-varying Signal Analysis and Curve Approximation", Ph.D. awarded 1990

Ustuner, K.F., "Discrete Polynomial Splines: Applications in Computer Graphics and Signal Processing," Ph.D. awarded 1989

Komaili, J., "Algorithms for Information Extraction and Classification of Bandlimited Signals," Ph.D. awarded 1986

Shin, S.B., "Frequency Demodulation Based Ultrasonic Imaging and Tissue Characterization," Ph.D. awarded 1985

Radiological Sciences:

Chandler, P., "The Effect of Velocity Inhomogeneous, Lossy and Refractive Media on the 3-D Propagation of Bounded Ultrasonic Pulses," Ph.D. awarded 1986

Publications:

Editor:

E1   Proceedings of the International Symposium on Pattern Recognition and Acoustical Imaging, SPIE, Vol. 768, 1987

E2   Proceedings of the SPIE Conference on Curves and Surfaces in Computer Vision and Graphics, Vol. 1251, Santa Clara, CA, Feb 13-15, 1990

E3   Proceedings of the 30th Acoustical Imaging Symposium, Boston, MA, April, 1997

E4   Area Editor, Machine Vision and Applications, Sprinter-Verlag, 1988-1998

Associate Editor:

AE1   IEEE Transactions on Circuits and Systems for Video Technology, 1997-99

AE2   Machine Vision and Applications: An International Journal, 1997-99

Refereed Journal Articles:

J1   L. Ferrari and J. Sklansky, "A Fast Recursive Algorithm for Binary Valued Two Dimensional Filters," *Computer Vision, Graphics and Image Processing*, 26, 292-302, 1984

J2   L. Ferrari, P.V.Sankar and J. Sklansky, "Minimal Rectangular Partitions of Digitized Blobs," *Computer Vision*, *Graphics and Image Processing*, 28, 58-71, 1984

J3   L. Ferrari, P.V. Sankar, M. Fink, S.B. Shin, and P. Chandler, "The Use of Signal Phase in Medical Ultrasound," *ACTA Electronica*, Vol. 26, No.1/2 1984, p. 117-120, invited paper

J4   S. Leeman, L. Ferrari, J. P. Jones, M. Fink, "Perspectives on Attenuation Estimation from Pulse-Echo Signals," *IEEE Sonics and Ultrasonics*, V SU 32, No. 4, July 1984, invited paper

J5   L. Ferrari and J. Sklansky, "A Note on Duhamel Integrals and Running Average Filters,"   *Computer Vision, Graphics, and Image Processing*, 29, 358-360, 1985

J6   L. Ferrari and J. P. Jones, "The Propagation of Gaussian-Shaped Pulses in Tissue and Other Attenuating Media" *Ultrasound in Medicine and Biology*, Vol. 11, No 2, pp 299-305, 1985

J7   L. Ferrari, J. P. Jones and V. Gonzalez, "In vivo Measurement of Attenuation," *Ultrasonics,* March 1986, pp 66-72

J8   J. Ophir, A. Ghouse, L. Ferrari, "Attenuation Estimation with the Zero-Crossing Technique: Phantom Studies," *Ultrasonic Imaging*, 7, pp 122-132

J9   J. Hoefs, D. Aufrichtig, S. Lottenberg, G. Kanel, B. Donner, L. Ferrari, S. Leeman and R.M. Friedenberg, "A Non-Invasive Evaluation of Hepatic Fibrosis Using Frequency Demodulation of Ultrasound Signals," *Digestive Diseases and Sciences*, Vol. 31, Oct 1986, pp 1046-1055

J10   D. Aufrichtig, S. Lottenberg, J. Hoefs, L. Ferrari, R. M. Friedenberg, G. Kanel, S. Leeman, "Frequency Demodulated Ultrasound Imaging--An Evaluation in the Liver," *Radiology*, July 1986, pp 59-64

J11   L. Ferrari, P. V. Sankar, J. Sklansky and S. Leeman, "Efficient Two-Dimensional Filters Using B-spline Representations," *Computer Vision, Graphics and Image Processing*, pp 152-169 (1986)

J12   J. Komaili, P. V. Sankar, L. Ferrari and S. Leeman, "The Instantaneous Frequency of Sinewave Squelched Bandlimited Signals" *Ultrasonic Imaging*, Vol. 8, No. 4, Oct 1986, pp 285-295

J13   A. J. Duerinckx, L. Ferrari, J. Hoefs, P.V. Sankar, D. Fleming and C. Cole-Beuglet, "Estimation of Acoustic Attenuation in Liver Using One Megabyte of Data and the Zero Crossings Technique," *Ultrasonics*, 24: 325-332, Nov 1986

J14   L. Ferrari, P.V. Sankar, S. Shinnaka and J. Sklansky, "Recursive Algorithms for Implementing Digital Image Filters," *IEEE Transactions on PAMI*, Vol. PAMI-9, No. 3, May 1987, pp 461-446

J15   J. Komaili, L. Ferrari and P.V. Sankar, "Estimating the Bandwidth of a Signal from the Level Crossings of its Envelope," *IEEE Trans on ASSP*, Vol. ASSP-35, No. 10, Oct 1987, pp 1481-1484

J16   P.V. Sankar and L. Ferrari, "Simple Algorithms and Architectures for B-spline Interpolation," *IEEE Trans. on PAMI*, Vol. 10, No. 2, Mar 1988, pp 271-276

J17   L. Ferrari, P.V. Sankar, "Minimum Complexity FIR Filters and Sparse Systolic Arrays," *IEEE Trans. on Computers*, Vol. 37, No. 6, June 1988, pp 760-764

J18   L. Shih, C. W. Barnes, L. A. Ferrari, "Estimate of Attenuation Co-efficient for Ultrasonic Tissue Characterization using Time-Varying State-Space Model," *Ultrasonic Imaging*, Vol. 10, 1988, pp 90-109

J19   A. J. Duerinckx, K. Rosenberg, J. Hoefs, C. Cole-Beuglet, G. Kanel, S. Lottenberg, L. A. Ferrari,   "In-vivo Acoustic Attenuation in Liver: Correlations with Blood Tests and History," *Ultrasound in Medicine and Biology*, 14(5), 1988

J20   D. Pang, L. A. Ferrari, "A Unified Approach to IFIR Filter Design Using B-Spline Functions," *IEEE Trans on Signal Processing,* Vol. 39, No. 9, September 1991, pp 2115-2118

J21   L. A. Ferrari, P. V. Sankar and M. J. Silbermann, "Efficient Algorithms for the Implementations of General B-Splines," *Computer Vision, Graphics and Image Processing*, CVGIP, Vol. 56, No. 1, January, pp. 102-105, 1994

J22   P. V. Sankar, M. J. Silbermann, and L. A. Ferrari, "Curve and Surface Generation and Refinement based on a High Speed Derivative Algorithm," *Computer Vision, Graphics and Image Processing*, CVGIP, Vol. 56, No. 1, January, pp. 94-101, 1994

J23   K. F. Ustuner, L. A. Ferrari, "Discrete Splines and Spline Filters," *IEEE Trans on Circuits and Systems - II Analog and Digital signal Processing,* Vol. 39, No. 7, July 1992, pp 417-422

J24   D. Pang, L. Ferrari, P.V. Sankar, "B-Spline FIR Filters," *Circuits, Systems Signal Processing*, Vol. 13, No. 1, 1993, pp. 31-64

J25   S. Y. Wang, L. Ferrari, M. J. Silbermann, "High Speed Computation of Spline functions and Applications," *International Journal of Imaging Systems and Technology*, Vol. 7, pp.1-15, 1996

J26   M. Harashima, L. Ferrari, P. V. Sankar, "Spline Approximation Using Kalman Filter State Estimation," *IEEE Trans on Circuits and Systems II: Analog and Digital Signal Processing*, Vol. 44, No. 5, pp. 421-424, May 1997

J27   L. Ferrari, Jae Park, A. Healey, S. Leeman, "Interpolation Using a Fast Spline Transform (FST)," I*EEE Transactions on Circuits and Systems-II: Analog and Digital Signal Processing,* August 1999

J28   J. Refling, L.Ferrari, "An Algebraic Recurrence for the Z-Transform of the One-Sided Power Function," SIAM, 1999

Refereed Conference Articles:

RC1   L. Ferrari, J. Jones, V. Gonzalez, and M. Behrens, "Acoustical Imaging Using the Phase of Pulse-Echo Waveforms," *Acoustical Imaging*, Vol. 12, pp 635-641, 1982

RC2   D. A. Seggie, S. Leeman, and L. Ferrari, "Ultrasonic Imaging Using the Instantaneous Frequency of Pulse-Echo Signals," *Acoustical Imaging*, Vol. 14, pp 487-496, 1985

RC3   S. Leeman, P. E. Chandler, L. A. Ferrari, "Diffraction Tomography with Multiple Scattering," *Acoustical Imaging*, Vol. 15, pp 29-34, Editor: H.W. Jones, New York, NY; Plenum 1987

RC4   L. Ferrari, P. V. Sankar, D. Pang and M. Harashima, "High Resolution High Speed Wigner Distribution for Sonar Applications," *Acoustical Imaging*, V17, Editors: Glen Wade and Hua Lee, New York, NY; Plenum 1989

RC5   D. Pang, L. A. Ferrari, "Application of B-Splines in Digital Filtering," IEEE ASSP 6th Workshop on Multidimensional Signal Processing, Pacific Grove, CA, Sept 6-8, 1989 (invited paper)

RC6   D. Pang, L. A. Ferrari, "A Unified Approach to General IFIR Filter Design Using B-Spline Functions," Proceedings of the 23rd Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Oct 30 - Nov 1, 1989

RC7   D. Pang, L. A. Ferrari and P. V. Sankar, "A Modified Music Algorithm for Detecting Sinusoids" Proceedings of the 23rd Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Oct 30 - Nov 1, 1989

RC8   M. J. Silbermann, P. V. Sankar, L. A. Ferrari, "Implementation of Nonuniform Rational B-Splines (NURBS) using a Derivative Recurrence," Proceedings of the 23rd Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Oct 30 - Nov 1, 1989

RC9   L. A. Ferrari, M. J. Silbermann, P.V. Sankar, "Efficient Curve and Surface Generation Using High Order Differencing," Proceedings of the SPIE Conference on Curves and Surfaces in Computer Vision and Graphics, Santa Clara, CA Feb 13-15, 1990

RC10 S-Y Wang, L. A. Ferrari, "Automatic Data Visualization Using Spline Functions," Proceedings of the 24th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov 5-7,1990

RC11 L. Ferrari, D. Pang, K.F. Ustuner, "Splines and Digital Signal Processing," *Curves and Surfaces*, Edited by: Pierre-Jean Laurent, Alain Le Mehaute, Larry L. Schumaker, Academic Press, 1991

RC12 M.J. Silbermann, S.Y. Wang, L.A. Ferrari, "Efficient Computation of Multiple Knots Non-uniform Spline Functions," *Curves and Surfaces,* Edited by: Pierre-Jean Laurent, Alain Le Mehaute, Larry L. Schumaker, Academic Press, 1991

RC13 A. Healey, S. Leeman, M. Betts, L. Ferrari, "A Novel Pulse-Echo Attenuation Estimation Technique," *Proceedings of the 1993 Ultrasonics Symposium*, Baltimore, MD, Oct 31 - Nov 3,   1993

RC14 J. Refling, L. Ferrari, "Pipelined Implementation of B-Splines and Beta-Splines for Computer Graphics and Visualization Applications,"

Proceedings of the 27th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Oct 31-Nov 3, 1993, pp 548 -552

RC15 L. Ferrari, P.V. Sankar, "Efficient Spline Interpolation," Proceedings of the 29th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, October 30-Nov 1, 1995

RC16 M. Harashima, P.V. Sankar, L. Ferrari, "Time-Frequency Representation for Time-Varying Signals Using a Kalman Filter," Proceedings of the 29th Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, October 30-Nov 1, 1995

RC17 T. Pitt, L. Ferrari, A. Healey, R. A. Reynolds, K. Humphries, "Splatting and Splines in 3D Medical Ultrasound Imaging," Proceedings of the 21st International Symposium on Acoustical Imaging, Laguna Beach, CA, March 28-30, 1994, pp. 349-355

RC18 S. Leeman, A. Healey, L. Ferrari, "A Novel Pulse-Echo Attenuation Imaging Technique," Proceedings of the 21st International Symposium on Acoustical Imaging, Laguna Beach, CA, March 28-30, 1994, pp. 445-452

RC19 S. Leeman, M. Betts, L. Ferrari, "Multiple Scattering and Diffraction Tomography," Proceedings of the 22nd International Symposium on Acoustical Imaging, Florence, Italy, September 3-7, 1995, pp. 74-80

RC20 A. Healey, S. Leeman, L. Ferrari, "Removing Ambiguity in Single Image Speckle Reduction Techniques," Proceedings of the 22nd International Symposium on Acoustical Imaging, Florence, Italy, September 3-7, 1995, pp. 145-150

RC21 L. Ferrari, J. Park, "An Efficient Spline Basis for Multi-Dimensional Applications: Image-Interpolation," Proceedings of the 1997 IEEE International Symposium on Circuits and Systems, Hong Kong, June 9-12, 1997, Vol. 1, pp. 747-760

RC22 J. Park and L. Ferrari, "The (2-5-2) Spline Function," Proceedings of the St. Malo Conferences on Curves and Surfaces, July 1999

Conference Articles:

C1   L. Ferrari, P. V. Sankar, J. Sklansky, "Minimal Rectangular Partitions of Digitized Blobs,"   Proceedings of the Fifth International Conference on Pattern Recognition, Miami, FL, December, 1980

C2   V. Gonzalez, J. P. Jones, L. Ferrari, and M. Behrens, "The Analysis of A-Mode Waveforms with a One-Dimensional Texture Algorithm," Proceedings 1981 IEEE Ultrasonics Symposium, October 1981

C3   L. Ferrari and M. Zoeller, "Existing and Future Capabilities in Instrumentation Magnetic   Recording," Proceedings of the First International Conference and Workshop on Picture   Archiving and Communication Systems for Medical Applications, Newport Beach, CA, January 1982

C4   J. Komaili, and L. Ferrari, "Models of Binary Time Series," Proceedings of the Asilomar Conference on Signal Processing, Pacific Grove, CA, Nov 1984

C5   D. Seggie, S. Shin, S. Leeman, P. V. Sankar, L. Ferrari, "Application of Phase Information in Ultrasound Imaging," Proceedings of the IEEE Ultrasonics Symposium, Dallas, TX, 1984

C6   S. Leeman, D. Seggie, L. Ferrari, P. V. Sankar, and M. Doherty, "Diffraction-Free Attenuation Estimation," Proceedings of Ultrasonics International, King's College, London, July 1985

C7   W. T. Mayo, P. V. Sankar and L. Ferrari, "Color Coding Medical Ultrasound Tissue Images with Frequency Information," Proceedings of SPIE's 29th Annual International Symposium, San Diego, CA, Aug 18-23, 1985

C8   S. Leeman, D. Seggie, E. J. Costa, V. Roberts, L. Ferrari and P. V. Sankar, "Models for Medical Ultrasound Pulse Echo Images," Proceedings of the Second Image Symposium of Semaine Internationale De L'Image Electronique, Nice, France, April 1986

C9   S. Leeman, P. Chandler, L. A. Ferrari and D. A. Seggie, "Validity of the Born and Rytox Approximations," Proceedings of the 12th ICA Associated Symposium on Underwater Acoustics, July 1986

C10   L. Ferrari, P. V. Sankar, "B-splines, Interpolation and Digital Signal Processing," Invited: Proceedings of the 20th Annual Asilomar Conference on Signals, Systems and Computers, Nov 1986

C11 J. Komaili, P. V. Sankar, D. Fleming and L. A. Ferrari, "Classification of Bandlimited Data Using Level Crossing," Proceedings of the International Symposium on Pattern Recognition and Acoustical Imaging, SPIE, Vol. 768, pp 340-342, 1987

C12 L. A. Ferrari, P. V. Sankar, J. Sklansky, D. Fleming, "High Speed Image Processing Algorithms and Architectures for Medical Applications," Proceedings of the International Symposium, CAR '87, Springer-Verlag, pp 744-748, 1987

C13 L. A. Ferrari, "Application of B-spline Functions in Digital Signal Processing," Electronic Imaging 88, pp 527-530, March 1988

C14 M. J. Silbermann, P. V. Sankar, L. A. Ferrari, "Computational Models for B-spline Curves and Surfaces: A High Speed Approach," Electronic Imaging 88, pp 1086-1090, Oct 1988

C15 L. A. Ferrari, "High Speed Image Processing," Proceedings of the SPIE 42nd Annual Conference, Boston, MA, May 14-19, 1989

C16 S. Leeman, M. Betts, L. A. Ferrari, "Multiple Scattering and Diffraction Tomography," Acoustical Imaging Proceedings, Vol. 22, pp. 75-80, 1996.

C17 A. Healey, S. Leeman, L. A. Ferrari, "Removing the Ambiguity from Single Image Speckle Reduction Techniques," Acoustical Imaging Proceedings, Vol. 22, pp. 145-150, 1996.

C18 W. H. Tranter and L. A. Ferrari, "The Graduate Program in Information Technology at Virginia Tech," Proceedings of the ASEE/IEEE Frontiers in Education Conference, San Juan, Puerto Rico, November 10-14, 1999

Invited Presentations:

IP1 L. Ferrari, S. Leeman, S. Shin, D. Seggie, and D. Aufrichtig, "The FM Ultrasound Image: Something From Nothings," invited presentation: 37th Annual Conference on Engineering in Medicine and Biology, September, 1984

IP2 L. Ferrari, "Recursive Algorithms for Image Filtering" Santa Ana, CA, October 24, 1985, IEEE ASSP

IP3 L. Ferrari, "High Speed Image Processing: Algorithms, Architectures and Circuits," IBM   Research: Distinguished Lecture Series, San Jose, CA, July 31, 1986

IP4   L. Ferrari, P. V. Sankar, "B-Splines, Interpolation and Digital Signal Processing," 20th Asilomar Conference on Signals, Systems and Computers, Nov. 10-12, 1986

IP5   L. Ferrari, "Efficient Image Processing," 56th Annual International Meeting of the Society of Explorational Geophysicists, Houston, TX, Nov. 6, 1986

IP6   L. A. Ferrari, "Efficient Image Processing using B-Spline Functions," Dept. of Electrical and Computer Engineering, UC Santa Barbara, July 1987

IP7   L. Ferrari, "Application of B-Spline Functions in DSP," Electronic Imaging 88, Anaheim, CA, March 28-31, 1988

IP8   M. Silbermann, P. V. Sankar, L. Ferrari, "Computational Models for B-Spline Curves and Surfaces: A High Speed Approach," Electronic Imaging 88, Boston, MA, Oct 3-6, 1988

IP9   L. Ferrari, "High Speed Image Processing" SPSE Symposium on Image Perception, Boston, MA, May 17, 1989

IP10   L. Ferrari, "Efficient Curve and Surface Generation," SPIE Conference on Curves and Surfaces in Computer Vision and Graphics, Santa Clara, CA, Feb 14, 1990

IP11   L. Ferrari, "Efficient curve and Surface Generation Using High Order Differencing," Naval Ocean Systems Center, San Diego, CA, April 30, 1990

IP12   L. Ferrari, "Efficient Curve and Surface Generation Using High Order Differences," UC Santa Barbara, Dept of ECE, May 18, 1990

IP13   L. Ferrari, "Spline Generation and Refinement," UC Santa Cruz, CSE Bd, August 10, 1991

IP14   L. Ferrari, "High-speed graphics Algorithms," UC Berkeley, EECS Department, July 1992

IP15   L. Ferrari, "Efficient Implementation of Retinal Models," Polaroid Corp., Cambridge, MA, August 1993

IP16   L. Ferrari, Presentation to the William Preston Society, "Virtual Corporations, A New Concept in Education," Blacksburg, VA, May 1997

IP17 L. Ferrari, Presentation to the Minister of Education, "The Bradley Department of Electrical and Computer Engineering Overview," Bangkok, Thailand, June 1997

IP18 L. Ferrari, Presentation to the Faculty of Kasetsart University, "The Bradley Department of Electrical and Computer Engineering Overview," Bangkok, Thailand, June 1997

IP19 L. Ferrari, Presentation to the Faculty of King Mongkut's Institute of Technology, "The Bradley Department of Electrical and Computer Engineering Overview," North Bangkok, Thailand, June 1997

IP20 L. Ferrari, "Effective Computation of Splines," IEEE International Symposium on Circuits and Systems, Hong Kong, June 1997

IP21 L. Ferrari, "A New Way for Industry-University Cooperation: Real or Virtual Corporations," Global Engineering Education Symposium, Grenoble, France, December 1997

IP22 L. Ferrari, Presentation to the Higher Education Directors of Economic Development Programs, Blacksburg, VA, September 1997

IP23 L. Ferrari, Presentation to the Virginia Economic Development Partnership on the Microelectronics Consortium, Blacksburg, VA, October 1997

IP24 L. Ferrari, Presentation to the Higher Education Directors of Economic Development on the Microelectronics Consortium, James Madison University, Harrisonburg, VA, October 1997

IP25 L. Ferrari, Presentation to the Southeastern University and College Coalition for Engineering Education (SUCCEED) on the Virtual Corporation Program, Charlotte, NC, March 1998

IP26 L. Ferrari, Presentation to the Economic Development Advisory Board, Blacksburg, VA, May 1998

IP27 L. Ferrari, Presentation for the Industry Opportunities Open House on the Virtual Corporation, Blacksburg, VA, June 1998

IP28 L. Ferrari, "Department Overview" presentation to Congressman Rick Boucher and TASC (a division of Litton Industries), Blacksburg, VA, October 1998

IP29   L. Ferrari, "University-Public-Private Partnerships," Economic Development Conference, Blacksburg, VA, February 1999

IP30   L. Ferrari, Workshop on Spline Computation and Graphics, Lausanne, Switzerland, (5-½ day sessions), June 1999

IP31   L. Ferrari, Presentation to Advisory Board for the Center for Adhesives and Sealant Science, "Overview on Microelectronics," Blacksburg, VA, October 1999

IP32   L. Ferrari, "Industry University Relations in the U.S.," presentation to the entire faculty of EPFL, Charmey, Switzerland, February 2000

IP33   L. Ferrari, "Industry University Relations in the U.S.," presentation to the Electrical Engineering Department, Hong Kong Polytechnic University, Hong Kong, February 2000

IP34   L. Ferrari, "University Entrepreneurship," presentation to Commercializing Innovative University Research in The United States and in France, University of Pennsylvania, Philadelphia, PA, Dec 3-5, 2000

Presentations:

P1   J. P. Jones, V. Gonzalez, M. Behrens, and L. Ferrari, "In-Vivo Differentiation of Abdominal Organs in Thirty Normal Human Subjects by the Analysis of A-Mode Ultrasound Waveforms," presented at the 6th International Symposium on Ultrasonic Imaging and Tissue Characterization, National Bureau of Standards (June, 1981)

P2   J. P. Jones, M. Behrens, L. Ferrari, and V. Gonzalez, "In-Vivo Differentiation of Abdominal Organs and the Early Detection of Cirrhosis of the Liver by the Quantitative Analysis of A-Mode Ultrasound Waveforms," presented at the 26th Meeting of the American Institute of Ultrasound in Medicine, San Francisco (August, 1981)

P3   L. Ferrari, J. Jones, V. Gonzalez, and M. Behrens, "Ultrasound B-Mode Images Derived from the Phase of A-Line Echo Signals" presented at the 7th International Symposium of Ultrasonic Imaging and Tissue Characterization, National Bureau of Standards (June, 1982)

P4   L. Ferrari, J. Jones, V. Gonzalez, and M. Behrens, "In-Vivo Measurement of Attenuation Based on the Theory of Gaussian Pulse Propagation,"

presented at the 7th International Symposium of Ultrasonic Imaging and Tissue Characterization, National Bureau of Standards (June 1982)

P5   V. Gonzalez, J. Jones, L. Ferrari, and M. Behrens, "The Application of a One- Dimensional Texture Algorithm to A-Mode Ultrasound Waveforms Recorded In-Vivo," presented at the 7th International Symposium on Ultrasonic Imaging and Tissue Characterization, National Bureau of Standards (June 1982)

P6   J. P. Jones, L. Ferrari, V. Gonzalez, M. Behrens, and M. Grossman, "Diagnostic Significance of   the Acoustical Properties of Certain Biological Fluids," presented at the Third Meeting of the World Federation for Ultrasound in Medicine and Biology, Brighton, England (July 1982)

P7   J. P. Jones, L. Ferrari, V. Gonzalez, M. Behrens, and E. Rojas, "Ultrasonic Phase Imaging" presented at the 27th meeting of the AIUM, Denver, Colorado, October 4-8, 1982

P8   J. P. Jones, L. Ferrari, P. Chandler, and S. Leeman, "FM Imaging: Further Studies," presented at the 8th International Symposium on Ultrasonic Imaging and Tissue Characterization, Washington, DC

P9   D. Aufrichtig, J. Hoefs, S. Lottenberg, R. Friedenberg, L. Ferrari and R. Ranalli, "A Comparison of Images Derived from the Envelope and Instantaneous Frequency of Pulse Echo Signals," presented at the 9th International Symposium of Ultrasonic Imaging and Tissue Characterization, National Bureau of Standards, Washington, DC, June 1984

P10   L. Ferrari, R. Ranalli, and G. Gopinathan, "A Comparison of Images Derived from the Envelope and Instantaneous Frequency of Pulse Echo Signals: Experimental Results," presented at the 9th International Symposium Ultrasonic Imaging and Tissue Characterization, National Bureau of Standards, Washington DC, June, 1984

P11   L. Ferrari, G. Gopinathan, R. Ranalli, "The Characteristics of an Ultrasound Image Produced from Frequency Signal Processing of the RF Waveform," presented at the 29th AIUM/SDMS Annual Convention, Kansas City, MO, September, 1984

P12   D. Aufrichtig, J. Hoefs, S. Lottenberg, and L. Ferrari, "A Comparison of Images Derived from the Envelope and Instantaneous Frequency of Pulse Echo Signals: Liver Disease," 70th Meeting of the RSNA, Washington DC, November, 1984

P13   J. Ophir, M. Ghouse, and L. Ferrari, "Attenuation with the Zero Crossing Technique," Fourth Meeting of the WFUMB, July 14-19, 1985, Sydney, Australia

P14   S. Leeman, D. Seggie, L. Ferrari, and P. Sankar, "Diffraction Free Attenuation Estimation," Ultrasonics International, London, England, July 1985

P15   D. Seggie, S. Leeman, G. Doherty, and L. Ferrari, "Digital Image Processing for Instantaneous Frequency Mapping," 29th Annual Technical Symposium on SPIE, San Diego, CA, 1985

P16   S. Leeman, L. Ferrari, P. V. Sankar, "Diffraction Correction: Fact or Fallacy," 10th International Symposium on Ultrasonic Imaging and Tissue Characterization, Washington, DC, 1985

P17   J. Ophir, A. Ghouse, L. Ferrari, "Resolution and Accuracy Using the Zero Crossing Attenuation Technique," 10th International Symposium on Ultrasonic Imaging and Tissue Characterization, Washington, DC, June, 1985

P18   D. Seggie, L. Ferrari, S. Leeman, "Ultrasonic Imaging Using Instantaneous Frequency Imaging," 14th International Symposium on Acoustical Imaging, The Hague, Netherlands, April 1985

P19   A. Duerinckx, J. Hoefs, L. Ferrari, S. Lottenberg, C. Cole-Beuglet, "Attenuation of Ultrasound in Diffuse Liver Disease In Vivo Using the Zero Crossing Technique," presented at the RSNA 71st Scientific Assembly and Annual Meeting, November 20, 1985

P20   J. Komaili, L. Ferrari, P. V. Sankar, S. Leeman, "The Instantaneous Frequency of a Sinewave Squelched Bandlimited Signal," Eleventh International Symposium on Ultrasonic Imaging and   Tissue Characterization, Washington, DC, June 2, 1986

P21   A. Duerinckx, L. Ferrari, P. V. Sankar, "Data Requirements for Estimation of Acoustic Attenuation in Liver Using the Zero-Crossing Technique," Eleventh International Symposium on   Ultrasonic Imaging and Tissue Characterization, Washington, DC, June 2, 1986

P22   K. Rosenberg, A. Deurinckx, J. Hoefs, L. Ferrari, D. Aufrichtig, C. Cole-Beuglet, "Estimation of Acoustic Attenuation in Liver: Difficulties with a Narrowband Estimator and the Importance of Fat," Eleventh International

Symposium on Ultrasonic Imaging and Tissue Characterization, Washington, DC, June 2-4, 1986

P23   S. Leeman, P. Chandler, L. Ferrari, "Diffraction Tomography with Multiple Scattering," Fifteenth Symposium on Acoustical Imaging, Halifax, N.S., Canada, July 14-18, 1986

P24   S. Leeman, P. Chandler, L. Ferrari, D. Seggie, "Validity of the Born and Rytox Approximations," Twelfth ICA Association Symposium on Underwater Acoustics, Halifax, Canada, July 16-18, 1986

P25   A. Duerinckx, J. Hoefs, C. Cole-Beuglet, P. V. Sankar, L. Ferrari, "Estimation of Acoustic Attenuation in Diffuse Liver Disease: Can It Be Done with the Zero-Crossing Technique?" Fifteenth Symposium on Acoustical Imaging, Halifax, N.S., Canada, July 14-16, 1986

P26   A Duerinckx, D. Aufrichtig, J. Hoefs, L. Ferrari, C. Cole-Beuglet, "The Importance of Fat in the Estimation of Acoustic Attenuation in Liver with a Narrowband Amplitude Estimator," 31st AIUM Annual Convention, Las Vegas, NV, Sept. 16-19, 1986

P27   D. Aufrichtig, A. J. Duerinckx, J. C. Hoefs, K. Rosenberg, C. Cole-Beuglet, G. Kanel, L. Ferrari, "In-vivo Acoustic Frequency Modulation (FM) in Liver: A Preliminary Report on Correlations with Histology," Radiology: 161(P):249, 1986, Presented at the RSNA 72nd Scientific Assembly, Chicago, November 1986

P28   J. P. Refling, P. V. Sankar, L. A. Ferrari, "A New Interpolation Algorithm for Computer Graphic and Image Processing Based on B-Splines," SIAM Annual Meeting, San Francisco, CA, June 1988

P29   L. Ferrari, "High Speed Image Processing," SPIE 42nd Annual Conference, Boston, MA, May, 1989

P30   L. Ferrari, P.V. Sankar, D. Pan, H. Masahara, "High Resolution Wigner Distribution for Sonar Signals," 18th International Symposium on Acoustical Imaging, Santa Barbara, CA, Sept 18-20, 1989

P31   L. Ferrari, M.J. Silbermann, P.V. Sankar, "Efficient Curve and Surface Generation Using High Order Differencing," SPIE Conference on Curves and Surfaces in Computer Vision and Graphics, Santa Clara, CA, Feb 13-15, 1990

P32   L. Ferrari, "2-5-2 Splines," Chamrousse Conference, 2000", INPG, Grenoble, France, Feb 22-25, 2000

Patents:

U1   L. Ferrari, "High Voltage Switching for Three-Color Line-Sequential Color Television," U.S. Patent 3,452,245, June 24, 1969

U2   L. Ferrari, "Image Display from Continuously Moving Image Carrier," U.S. Patent 3,677,626, July 18, 1972

U3   L. Ferrari, "Method for Distinguishing Pauses in Recorded Features During Replay," U.S. Patent 3,723,666, Mar. 27, 1973

U4   L. Ferrari, "Video Recording and Display," U.S. Patent 3,833,758, Sept. 3, 1974

U5   L. Ferrari, "Video Information Recording and Reproduction," U.S. patent 3,944,728, March 16, 1976

U6   L. Ferrari, "Image Display from Moving Image Carrier," U.S. Patent 3,967,888, July 6, 1976

U7   L. Ferrari and J. Lancor, "Image Display from Continuously Moving Image Carrier," U.S. Patent 3,968,506, July 6, 1976

U8   L. Ferrari and J. Taite, "Decor Composition and Display Systems," U.S. Patent 4,318,121, March 2, 1982

U9   E. Land, L. Ferrari, S. Kagan, J. McCann, "Image Reproductive System which Detects Subject by Intensity Ratios," U.S. Patent 3,651,252, March 21, 1972

U10   L. Ferrari, "Audio Playback System," U.S. Patent issued 1971

U11   L. Ferrari, "Sound Attenuation Measurement System" U.S. Patent 4,569,353, February 11, 1986

U12   L. Ferrari, "Ultrasonic Acoustic Imaging Apparatus," U.S. Patent 4,543,826, October 1, 1985

U13   L. Ferrari, "Acoustical Imaging System," U.S. Patent 4,605,008, Aug 12, 1986

U14   L. Ferrari, P.V. Sankar, M.J. Silbermann, "Method and Apparatus for Calculating Spline Functions and Geometric Forms," U.S. Serial No. 251,663.

U15   LFerrari & P.V. Sankar, "Non-uniform Sampling approach to data Compression, Awarded August 2013

Extramural Research Support:

1991-1996*   NSF Funding for the Center for High Speed Image Processing

                            Funds: $500,000

1994	Interstate Electronics	Funds: $35,000
	NRAD	Funds: $35,000
	DOE	Funds: $10,000
	NSF	Funds: $25,000
	Western Digital	Funds: $65,000
	SMC Corp.	Funds: $30,000
	Silicon Systems, Inc	Funds: $35,000
	Rockwell Science Center	Funds: $25,000
	Rockwell DCD	Funds: $10,000
1993	Interstate Electronics	Funds: $35,000
	NRAD	Funds: $35,000
	DOE	Funds: $10,000
	NSF	Funds: $25,000
	Western Digital	Funds: $65,000
	SMC Corp.	Funds: $30,000
	Silicon Systems, Inc	Funds: $35,000
	Rockwell Science Center	Funds: $25,000
	Rockwell DCD	Funds: $10,000
1992	Rockwell Science Center	Funds: $18,000
	Rockwell	Funds: $10,000
	Hughes	Funds: $25,000
	Interstate Elect.	Funds: $35,000
	NRAD	Funds: $35,000
	Western Digital	Funds: $65,000
	SSI	Funds: $35,000
	McDonnell-Douglas	Funds: $25,000
	Loral Aerospace	Funds: $25,000

1991	Rockwell	Funds: $18,500
	Rockwell Science	Funds: $15,000
	NRAD	Funds: $25,000
	Interstate Electronics	Funds: $20,000
	Western Digital	Funds: $25,000
	Loral Aerospace	Funds: $25,000
	Hughes	Funds: $25,000
	McDonnell-Douglas	Funds: $25,000
	Valid Logic	Funds: $25,000
	Total	$1,507,500

Additional Funds for 1991-1993

JPL Project 1992-1995	$317,000
UC MICRO 1991-1993	$ 75,000
SUN Microsystems Equipment Grant	$ 27,040

Prior Funding (1981- 91)

Funding: Medical Ultrasound Imaging

Phillips Ultrasound (1983-88)	$2,728,040
National Institutes of Health	154,000
Equipment Grants	975,000
	$3,457,040

Funding: Digital Signal Processing (1988-90)

1990-91 "Parallel Computer Graphics: A Derivative Summation Approach"

UC MICRO Program, Interstate   Funds: $28,000

1990-91 "Automatic Geometric Modeling for Digital Filtering and Scientific Visualization," Rockwell   Funds: $35,000

1989-90 "Optimal B-Spline FIR Filters"
UC MICRO Program, Rockwell   Funds: $32,000

1989-90 "Parallel Sonar Signal Processing

UC MICRO Program, Interstate   Funds: $83,800

1989-90 "High Speed Color Reflectance Imaging"
UC Micro Program with T. Cornsweet   Funds: $48,000

1988 Conference for Regional Center for High-speed Image/Signal Processing, National Science Foundation   Funds: $8,890

1988-89 "Architectures for Image Analysis and Pattern Recognition"
UC Micro Program, Co-PI: J. Sklansky   Funds: $83,500

1988-89 "Image and Signal Processing Architectures and Circuits"
UC Micro Program, Co-PI: B. Bavarian, P.V. Sankar
                                                    Funds: $117,850

1988-89 "Imaging Research"
PDA Engineering   Funds: $25,000

1988-89 "Medical Ultrasound"
Philips Ultrasound   Funds: $18,000

Industrial Experience:

1974-82 Consultant to Bell & Howell Electronic Instruments Group for development and evaluation of new product concepts for magnetic tape and instruments groups. Specific tasks included the following: computer modeling, analysis and evaluation of modulation and error correcting codes for use on magnetic tape systems. Evaluation and analysis of optical digital recording systems. Design and analysis of servo controlled light beam guidance systems.

1975-76 Consultant to TV Disk Corp., 504 Totten Pond Road, Waltham, Massachusetts. Completed design, construction and testing of a consumer video disc recorder/player. FM signals were recorded by contact recording on special magnetic discs.

1968-74   Manager, Electronic Sciences Group, Bell & Howell Research Laboratories, Pasadena, California. Established a group of fifteen engineers and scientists involved in the application of electronic technology to new product concepts and development. Personally authored fifteen patent disclosures in the fields of video systems, magnetic recording, optical projection systems, optical character recognition and consumer audio products.

During 1973-74, developed a method of limited optical character recognition and established a program to prove product feasibility. (One patent authored.)

During 1972, was given project responsibility for the development of a scan conversion video recording system. A fixed head record, rotating head playback, magnetic video recorder was constructed. (One patent authored).

During 1971, began efforts in video recording. Was the project engineer responsible for circuit design (video amplifiers, CRT viewfinder, signal processing). Demonstrated sophisticated techniques for flutter removal and bandwidth reduction. (One patent authored.)

During 1969-70, developed state-of-the-art continuous motion film projector system, conceived the system approach, designed circuitry, and the galvanometer image compensator (two patents authored). Designed circuitry for programmable audio cassette machines. Supervised the design of digital delay circuits for use in consumer audio products (one patent authored).

1963-68   Project Engineer, Bell & Howell Communications, Waltham, Mass. Responsibilities included the electronic systems and circuit design and a time sequential color television receiver utilizing penetration type cathode ray tubes and the development of human vision models for photographic and machine vision applications.

1967-69   Personal Consultant to Dr. Edwin Land, President and Founder Polaroid Corporation: Completed modeling and construction of a model of the human visual system based on reflection instead of energy absorption.

Some Accomplishments at Virginia Tech: 1995-2003

Research:

- Developed several important new contributions to the theory and computation of mathematical splines. Splines form the basis of CAD-CAM graphics and finite element numerical equation solutions. My work has focused on the development of efficient algorithms and computational procedures that have reduced the complexity of spline computation by orders of magnitude. In particular, I developed recursive computational algorithms based on a new derivative/summation procedure and a new

spline function, the 2-5-2 spline that has far superior numerical properties when compared to the traditional, commonly used B-spline functions.

The Bradley Department of Electrical and Computer Engineering:

- Under my leadership as Department Head, the annual research expenses for the ECE Department grew from $6.5 million in 1995 to approximately $25 million in 2000.

- I worked with the faculty in my Department to help obtain major research funding. During 1998, ECE was awarded a $10.2 million grant from the Naval Research Laboratories in the area of nano-structures and electro-optics. We also received (1999) a $12.5 million dollar award from NSF for an Engineering Research Center in the area of Power Electronics.

- Under my 5 year appointment, the ECE Department grew from ~50 to 73 permanent FTE faculty members over the period 1996-99

- I created the *Bradley Alliance for Education Program* that is leveraging new industry and government funds in an attempt to double the number of undergraduate and graduate students receiving full financial support in the ECE Department. The Department is now sharing Bradley fellowship costs with ECE faculty on a 1:1 funds matching basis. Through this method, we doubled the number of fellows in the Alliance for Education Program. This sharing arrangement worked well and increased the number of fellowships offered to students.

- During my tenure, the Department created M.S. and Ph.D. degrees in Computer Engineering.

- I led the development of an interdisciplinary Master of Information Technology degree as part of a K-18 IT Education Program.

University Level:

- Worked with several senior administrators, including the President and Executive Vice President, on the creation of a Venture Fund and establishment of a Corporate Incubator for high tech start-ups in Blacksburg and the Washington, D.C. region.

- The number of women obtaining bachelors degrees in computer science and engineering has decreased significantly since 1982. This is primarily due to the decrease in women in the fields of computer science and computer engineering. Dr. Ferrari established K-12 *Women's Opportunity*

Program in Computing (C-Tech-2) at Virginia Tech and within the Montgomery County Public Schools and obtained substantial IBM and alumni support for the program. This program includes a summer residential program for high school juniors, and the establishment of a computer lab at Margaret Beeks Elementary School in Blacksburg.

▪ Dr. Ferrari created, developed and managed a new campus-wide educational program, the *Virtual Corporation*, which organized 100 students from engineering, business, education, arts and sciences, veterinary medicine and human resources into student run virtual corporations. The students, freshmen--Ph.D., organize and run large corporations which develop products of significant economic value to Virginia and the nation's industrial community. Through NSF funds, corporate affiliate programs, industry gifts, and State support, Dr. Ferrari raised nearly $ 400,000 dollars to support the two newly formed virtual corporations which developed full business plans and initial designs for a hospital based medical informatics system and a personal rapid transit system.

   o The *Distributed Information Systems Corporation (DISC)* focuses on the development of distributed information storage and retrieval systems for hospitals. A team of students is designing a medical information system that will integrate multimedia data ranging from paper notes to real-time monitoring images with on-site hospital and remote access for doctors, nurses, pharmacists and others involved in patient care.
   o The students on *Personal Rapid Transit System (PERTS)* team prepared a feasibility study and developed a prototype personal rapid transit system that combined the efficiency of mass transit with the flexibility of a personal auto. This system can also be used for cargo transportation at major ports, shipping terminals, and airports.

▪ Dr. Ferrari helped establish the *Virginia Tech Information Systems Center (VISC)*, a joint Computer Engineering and Computer Science research center with more than fifteen participating faculty.
▪ Dr. Ferrari led the development of *Virginia Tech's Statewide Graduate Program in Information Technology*. The program offers both graduate degrees and certificates in networking, software, wireless communications, computer engineering, management sciences and accounting systems. The program is the first graduate program at Virginia Tech that is offered and taught jointly by the Colleges of Engineering, Arts and Sciences and Business. More than 500 off-campus graduate students eventually enrolled in the program that was designed to support

the growing needs of Virginia's information technology industry. He was instrumental in creating the program and helped obtain the support to see it implemented.

State of Virginia:

- From 1996-99, Dr. Ferrari served as *Director of the Virginia Microelectronics Consortium (VMEC)*, a collaborative Statewide microelectronics research and education program which includes six universities, three community colleges, Motorola, IBM, Toshiba, and Siemens. He co-authored a major legislative initiative for new educational funds for the consortium ($2.5 million/year permanent budget) to be forwarded to the General Assembly by the universities this legislative session. The proposal combines resources at the six universities (more than 50 faculty) to create the largest microelectronics materials and devices education program in the nation. Virginia Tech received $850,000 in State support during 1999 for the construction of new microelectronics facilities. Motorola has donated $500,000 in support of the same project. Motorola also donated in excess of $1.5 million worth of equipment.

- Dr. Ferrari helped establish the new Center for Microelectronics, Optoelectronics and Nanotechnology (MicrON) at Virginia Tech. He directed the efforts to establish an undergraduate program and cleanroom facility at Virginia Tech.

International Activities:

- Dr. Ferrari planned and received University approval in 1998 for the *Virginia Tech Alexandria Research Institute*, an off-site Research Consortium led by Virginia Tech, which will include several other local and international universities. He chaired the Implementation Task Force and worked with other department heads, Deans, the Provost's Office, a number of international corporations and the State Legislature to establish the Institute.

- Dr. Ferrari created and organized the *Lausanne Conference* (October 1998) between Virginia Tech, EPFL, Lausanne, Switzerland and INPG, Grenoble, France to promote funded research and global education programs. Joint activities have been initiated between the three universities in multi-media systems, transportation, power electronics and wireless communications. In addition, he works collaboratively with the EPFL in Lausanne in the development and implementation of DSP/Graphics algorithms on the Intel 64-bit microprocessor.

- Dr. Ferrari helped organize a follow-up conference in *Chamrousse, France* (January 2000) between Virginia Tech; EPFL, Lausanne, Switzerland; and INPG, Grenoble, France to promote funded research and global education programs.

- Dr. Ferrari served from 1996-2001 as the *Dean's Advisor to Hong Kong Polytechnic's Electrical Engineering Department.* He also served on an International Committee in 1996-97 that is helped Thailand redefine its graduate engineering programs.

- Dr. Ferrari continues to play an active role in the electrical and computer engineering research community. While at Virginia Tech, he became an *IEEE Fellow* for his contributions to engineering education and research in signal and image processing.

- He chaired the 1997 International Symposium on Acoustical Imaging in Boston, Massachusetts and served as Associate Editor of two prestigious technical journals (Machine Vision and Applications and the IEEE Transactions on Video Technology).

- Dr. Ferrari helped establish the Institute for Critical National Infrastructure (associated with the World Institute for Disaster Risk Management).

VT Academic Service:

Committees:

Member, Northern Virginia Information Technology Working Committee, 1997- 98

Member, Virtual Corporation Academic Issues College Committee, 1997- 01

Member, Economic Development Advisory Board, 1997- 01

Chair, Virtual Corporation Board of Directors, 1997- 01

Chair, Virtual Corporation Program Review Committee, 1997- 01

Chair, Alexandria Research Institute Implementation Committee, 1997- 98

Chair, Alexandria Research Institute Stakeholders Committee, 1997- 99

Advisor, ERC Center for Power Electronics (C-PES), 1998- 01

Member, Graduate Program in Information Technology Steering Committee, 1997- 01

Member, Chemical Engineering Department Head Search, 1997-99

Member, Pratt Funds Investment Committee, 1997-01

Member, College P&T Procedure Review Committee, 1997-98

Member, University Self Study Committee, 1997-99

Member, Provost's Technology Blueprint Committee, 1997-98

Member, NICHE, 1997-98

Member, Ph.D. Residency Committee, 1997-

Member, Center for Transportation Research Steering Committee, 1997-99

Member, Computing, Information, and Communications Technology Crosscutting Initiative, 1997-01

Member, Architects Subcommittee (Cross-Cutting Initiative), 1997-98

Director, Virginia Microelectronics Consortium (VMEC), 1997-99

Member, Virginia Microelectronics Consortium (VMEC), 1999-01

Member, The New Century Technology Council, 1997-01

Member, Bioinformatics Steering Committee, 1999

Member, College Conflict of Interest Committee, 1999-

Chair, CWT Stakeholders Committee, 1998 - 00

Member, Human-Computer Interaction Center Stakeholders Committee, 1999 - 2000

Member, Internet Technology Center Stakeholders Committee, 1999-20 00

Member, SRC Stakeholders Committee, 1999-2000

Member, CTR Stakeholders Committee, 1999

1998 Chaired the Post-Tenure Review Session at the National Electrical Engineering Department Heads Association (NEEDHA) Annual Meeting, Hawaii

1998 Moderator, "Northern Virginia Technology Nite" Panel Discussion

1995 Advisory and Program Committee, 29th Acoustical Imaging Symposium, Florence, Italy

Some Accomplishments at Naval Postgraduate School: 2003-2016

At NPS, I served as Vice Provost & Dean of Research from 2003-2005 and Provost from 2006-12. While Provost of the US Naval Postgraduate School, I became more interested and focused on the development of education and research curricula and programs that support national and global security, sustainable systems and international collaborations in support of the USN's Strategic Plan, which included conflict avoidance. I worked closely with Dr. Esther Brimmer, Assistant Secretary of State for International Organization Affairs in the Obama administration and Honorable Peter Verga, the Chief of Staff to the Assistant Secretary for DoD Policy.   With their approval, I founded the *Global Challenges Forum (GSF)* in Geneva Switzerland in 2009, which was hosted annually by Honorable Betty E. King, Ambassador, U.S. Mission, Geneva, Switzerland. Over a four-year period, the GSF was attended by hundreds of representatives from NGOs, universities, national defense organizations and many of the U.N. agencies based in Europe. The GSF founded the International Transformative Education Forum (TEF), which hosted an annual meeting and local workshops for several years, which was attended by some of the world's most innovative educational practitioners and theorists.

The GSF also led to the creation of an interdisciplinary NPS *Global Public Policy Group,* a graduate education program for active duty and Civil Affairs Reserve Officers of the U.S. Military and Allies at the Naval Postgraduate School. The Master's Degree Program examined problems in military civil affairs, global economics, population migration, climate change and many other global challenges, which can only be addressed through international cooperation. During my tenure as Provost, research and sponsored program funding at NPS grew from $40M/year to over $230M per year under the direction and approval of the Secretary of the Navy and several of the Chiefs of Naval Operations (CNO).

I stepped down as Provost at NPS in 2012, having been offered a three year (2012-2015), USN assignment at the Office of Naval Research Global (ONRG) as an Associate Director in London, UK. Because of the difficulty in finding a replacement Provost for NPS, I was asked to remain at NPS during 2012. I joined the ONRG one year later in 2013.

As Associate Director for Information Systems in the London, Office of Naval Research Global (ONRG). I was based in ONRG's London, UK Office from 2013-2016. I funded and interacted with 30 of the EU's top researchers in more than a dozen countries and supported 25 technical international conferences and workshops in fields spanning Information Systems, Weather Forecasting, Climate Change, Renewable Energy, Cyber Security, Predictive Analytics, Wireless Communications, Medical Diagnostics and High-speed, portable DNA analysis. My own current active research is in the areas of efficient data compression and computer graphics methods and algorithms.

While working for U.S. ONRG in London, from 2013-2017, I simultaneously served as the U.S. Navy Representative and the U.S. voting member on the NATO Information Systems Technology Panel. I was responsible for reviewing and approving U.S. participation in NATO Information Technology Projects. My responsibilities also included finding the appropriate U.S. scientists and engineers who were qualified to participate in these 1-3 year NATO projects.

I returned to the U.S. in 2016 to my tenured position as Professor, ECE at NPS. I retired from government service in February 2017 having enjoyed contributing to U.S. industry, three outstanding American universities, the U.S. Department of Defense, NATO and the international community over a career that began in 1963.