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Curriculum vitae of P. P. Vaidyanathan

Address: Department of Electrical Engineering 136-93, California Institute of Technology, Pasadena, CA 91125
Phone: (626) 395 4681.

Date and place of birth: October 16, 1954; Calcutta, India.

Education: B. Sc (with honors in Physics), 1974, B. Tech., Radiophysics and Electronics, 1977, M. Tech., Radiophysics and Electronics, 1979, all from University of Calcutta. Ph. D., Electrical and Computer Engineering, Univ. of California, Santa Barbara, 1982.

Occupation: Currently Full Professor of Electrical Engineering, California Institute of Technology, Pasadena, CA. Been on the faculty since 1983. Served as the Executive officer of Electrical Engineering (Department Head) from 2002 to 2005.

Current research interests: Multirate signal processing, digital filter banks, data compression, image processing, adaptive filters, wavelet transforms, multidimensional systems, fast algorithms, and applications of filter banks in digital communications.

Honors and Awards

- Recepient of the *Technical Achievement Award* of the IEEE Signal Processing Society, 2002 (one of the major awards of the society).
- Recepient of the *Golden jubilee medal* of the IEEE Circuits and Systems Society, 2000.
- Chosen as a *distinguished lecturer* for the IEEE Signal Processing Society for the year 1996-97.
- Recepient of the 1995 *F. E. Terman Award* of the American Society of Engineering Education (ASEE), sponsored by the Hewlett-Packard company.
- Fellow of the IEEE since 1991.
- Plenary speaker at the IEEE International Symposium on Circuits and Systems, Vancouver, BC, Canada, 2004.
- Plenary speaker at the *Fourth International Conference on Sampling Theory and Applications,* Orlando, May, 2001.
- Plenary speaker at the *Conference on Image Processing, Multiresolution analysis, and Statistics, sponsored by Georgia Institute of Technology,* Sept. 1999.
- Plenary speaker at the DFSP'98, Victoria, Canada, June 1998.

- Plenary speaker at the Eusipco '98, Rhode Island, Greece, 1998.
- Plenary speaker at the IEEE sponsored conference, SPCOM'95, Bangalore, India, 1995.
- Plenary speaker at the IEEE sponsored Asilomar Conference on Signals, Systems and Computers, 1988.
- Winner of the IEEE Acoustics, Speech and Signal Processing Society's Senior Award for the paper "Theory and design of M-channel maximally decimated quadrature mirror filters with arbitrary M, having the perfect reconstruction property," IEEE Trans. ASSP, pp. 476-492, April 1987.
- Coauthor of a paper for which the first author (former Ph.D student) received a prize from the IEEE Signal Processing Society in 1992. The paper is *T. Q. Nguyen and P. P. Vaidyanathan, "Structures for M-channel perfect reconstruction FIR QMF banks which yield linear-phase analysis filters," IEEE Trans. on Acoustics, Speech and Signal Processing, vol. 38, pp. 433-446, Mar. 1990.*
- Winner of the S. K. Mitra Memorial award, 1990, awarded by the Institution of Electronics and Telecommunications Engineers (IETE), India, for the paper published in the IETE journal in Sept-Oct. 1988.
- Winner of the IETE Students' Journal Award, 2009, awarded by the Institution of Electronics and Telecommunications Engineers (IETE), India, for the paper published in the IETE journal in 2008.
- Receipient of National Science Foundation's Presidential Young Investigator Award, 1986.
- Award for *Excellence in Teaching* from the *Associated students of California Institute of Technology*, 1983. This is an undergraduate student body at Caltech.
- Award for *Exceptional Teaching* from the *Graduate student council*, California Institute of Technology, 1993.
- Award for *Excellence in Teaching* from the *Associated students of California Institute of Technology*, 1994.
- University Fellowship, Univ. of California, Santa Barbara, for Ph. D studies, 1981-82.
- Outstanding Teaching Assistant Award, College of Engineering, UCSB, 1980-81.
- Directorate of Public Instruction (Government of West Bengal, India) stipend for the two-year M. Tech studies (1977-79).
- University of Calcutta stipend for the three-year duration of study of B. Tech (1974-77).

Publications

1. **Papers.** Over 400 papers have been authored or coauthored. Of these, about 150 are journal articles and the others are articles in various Conference Proceedings. Three of the journal papers have received prizes for technical quality. Six of the conference papers are plenary papers.
2. **Text books.**
   2.1 P. P. Vaidyanathan, *Multirate systems and filter banks,* Prentice Hall, 1993. This has been used for graduate level courses at many Universities, including Caltech.
   2.2 P. P. Vaidyanathan, *The theory of linear prediction,* Morgan & Claypool publishers, 2008.
   2.3 P. P. Vaidyanathan, S.-M. Phoong, and Y.-P. Lin, *Signal processing and optimization for transceiver systems,* Cambridge University Press, 2010.
3. **Chapters.** Several chapters have been written for various books (edited collections).

Professional experience

1. Sept. 2002-2005: Executive officer and Full Professor of Electrical Engineering, California Institute of Technology, Pasadena, CA.
2. July 1993-present: Full Professor of Electrical Engineering, California Institute of Technology, Pasadena, CA.
3. March 1988-June 1993: Associate Professor of Electrical Engineering, California Institute of Technology, Pasadena, CA.
4. March 1983-Feb 1988: Assistant Professor of Electrical Engineering, California Institute of Technology, Pasadena, CA.
5. Fall 1982- Winter 1983: Post Doctoral Researcher, Dept. of Electrical and Computer Engineering, UCSB.
6. Summer 1980-Summer 1982: Research and Teaching Assistant, Dept. of Electrical and Computer Engineering, UCSB.
7. Winter 1980- Spring 1980: Teaching Assistant, Dept. of Electrical and Computer Engineering, UCSB.

Other Professional Activities

- **Associate editor** for the IEEE Transactions on Circuits and Systems, 1999-2002.
- **Guest editor** for the Special Issue "Applications of digital signal processing", J. of the Franklin Institute, Nov. 1998.
- **Guest editor** for the Special Issue "Multirate systems, filter banks, wavelets, and applica-

tions", IEEE Circuits and Systems Transactions II, August 1998.

- **Guest editor** for the Special Issue "Theory and application of filter banks and wavelet transforms", IEEE Signal Processing Transactions, April 1998.
- **Special session organizer and chairman** for a session on *Optimization of subband coders based on the input signal,* IEEE Int. Symp. on Circuits and Systems, Monterey, CA, May 1998.
- **Editorial board member** for the journal *Applied and computational harmonic analysis,* 1993–
- **Associate editor** for the new journal *The IEEE Signal Processing Letters,* 1993–
- **Special session organizer and chairman** for a session on *Filter banks and wavelets* IEEE Int. Symp. on Circuits and Systems, Chicago, Illinois, May 1993.
- **Technical Program Chairman,** IEEE International Symposium on Circuits and Systems, San Diego, CA, May 1992.
- **Special Sessions Organizer and chairman,** for a session on *Multirate digital filters, filter banks and applications,* IEEE Int. Symp. on Circuits and Systems, New Orleans, Louisiana, May 1990.
- **Member,** Technical Committee on Digital Signal Processing, IEEE Signal Processing Society, 1990–
- **Member,** Technical Committee on Digital Signal Processing, IEEE Circuits and Systems Society, 1987–
- **Organizing editor** for a special mini-issue of the IEEE Transactions on Circuits and Systems, on *Complex Signal Processing*, April 1987.
- **Special Sessions organizer and chairman** for a session on digital filters, Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 1987.
- **Associate editor** for the IEEE Transactions on Circuits and Systems, 1985-87.
- **Vice Chairman** for the Technical Program Committee, at the IEEE International Symposium on Circuits and Systems, Newport Beach, CA, May 1983.
- **Editorial Reviewer** of textbook manuscripts for several leading publishers.
- **Reviewer** for several journals including IEEE and IEE. Reviewer for proposals submitted for the National Science Foundation.
- **Consultant** for several Companies in the US, in the Signal Processing technical area. This includes (i) Lockheed, (ii) Niravoice, (iii) Interstate electronics, and (iv) Aware, Inc., Boston. (v) the DSP group at the Jet Propulsion Laboratories (JPL) (vi) Sonix Technologies, Inc. Salt

Late city, Utah, (vii) Fish and Neave, Palo Alto, CA.

- **Professional Societies**: Member of the IEEE Societies on Circuits and Systems, Information theory, and Signal Processing.

Courses taught at Caltech

- 1983-1984: EE112abc. Three term sequence on *passive and active filters.*
- 1984-1987. EE112abc. Three term sequence on *digital signal processing.*
- 1987-88.

  Fall and winter: EE32ab, *Linear Systems* (required EE junior level course).

  Spring: EE128 (new course), *Multirate signal processing.*
- 1988-1989

  Fall and winter: EE112ab.

  Spring: EE164 (new course), *Adaptive filters, linear prediction and optimal filters.*
- 1990-1992: EE112ab and EE128 repeated.
- 1992-1993.

  Fall and winter: Taught EE32ab and supervised EE112ab.

  Spring: EE128 (mutitrate DSP and wavelets).
- 1993-1994 and 1994-1995: EE112 (DSP basics), EE128 (multirate DSP and wavelets), and EE166 (Data compression).
- 1995-1996: EE32a, EE32b and EE166 (Fall, Winter and Spring).
- 1996-1997: EE112, EE128, EE166 (Fall, Winter and Spring).
- 1997-1998: EE112, EE128 (Fall and Winter).
- 1999: EE32, EE112b , EE 112c (Fall, Winter, Spring).
- 2000-2001: EE112abc (Fall, Winter, Spring).
- 2002-: EE111, EE112ab (Fall, Winter, Spring).
- 2003-: EE112ab (Winter, Spring).

Vaidyanathan's students who received Ph.D from Caltech

1. Dr. T. Q. Nguyen (Ph.D, June 1989). Professor, Dept. Electrical Engineering, Boston University.
2. V. C. Liu (Ph.D, June 1990). Presently with General Instrument, San Diego, CA.
3. Dr. (Ms.) Z. Doganata (Ph.D, June 1990). Presently with the IBM T. J. Watson Research Center, Yorktown Heights, N.Y.

4. Dr. R. D. Koilpillai (Ph.D June 1991). Presently with the Ericsson, Inc., Research Triangle Park, NC.
5. Dr. V. Sathe (Ph.D June 1991). Presently with General Instrument, San Diego, CA.
6. Dr. Anand Soman (Ph.D 1993), Signal Labs, Bombay, India.
7. Dr. Tsuhan Chen (Ph.D 1993), Department head and Professor of Electrical Engineering, Cornell University.
8. Dr. Igor Djokovic (Ph.D 1995), Member of Technical staff, PairGain Technologies, Inc., Tustin, CA.
9. Dr. See-May Phoong (Ph.D 1996), Faculty at National Taiwan University, Taipei, Taiwan.
10. Dr. Yuan-Pei Lin (Ph.D 1997), Faculty at Chiao-Tong University, Hsinchu, Taiwan.
11. Dr. Jamal Tuqan (Ph.D 1998), Post Doctoral Researcher, IBM T. J. Watson Research Center, Yorktown heights, New York.
12. Dr. Ahmet Kirac (Ph.D 1998), Member of Technical Staff, Lucent Technologies, Huntington Beach, CA.
13. Dr. Murat Mese (Ph. D 2001), Member of Technical Staff, Sequoia Communications, Los Angeles, CA.
14. Dr. Sony Akkarakaran (Ph. D 2001), Member of Technical Staff, Sequoia Communications, Los Angeles, CA.
15. Dr. Bojan Vrcelj (Ph. D 2003), now at Qualcom, San Diego, CA.
16. Dr. Andre Tkacenko (Ph. D 2005), now at JPL, La Canada, CA.
17. Dr. Byung-Jun Yoon (Ph. D 2007), now a faculty member at Texas A&M University.
18. Dr. Borching Su, (Ph. D 2008), now at NextWave wireless, San Diego, CA.
19. Dr. Chun-Yang Chen, (Ph. D 2009), now with Facebook.

Vaidyanathan's students who are Fellows of the IEEE

1. Dr. T. Q. Nguyen (Ph.D, June 1989). Professor, Dept. Electrical Engineering, Boston University.
2. Dr. Tsuhan Chen (Ph.D 1993), Department head and Professor of Electrical Engineering, Cornell University.

Current Doctoral Students: Brian Weng, Piya Pal, and Chih-Hao Liu.

Grants and Contracts

1. National Science Foundation's Initiation Grant, NSF ECS 84-04245, 1984-1986, for $48,000.

2. Caltech's *Programs in Advanced Technology grant*, 1984-85 for $36,000. The grant has been renewed for 1985-86 and 1986-87, for comparable amounts.
3. National Science Foundation's Presidential Young Investigator Award, for the period 1986-1991. Full matching funds for the first two years have been obtained with partial support from GEC and Pacific Bell.
4. Naval Oceans Systems Center's Grant, N66001-85-D-0203, for 1986-87, for the amount $47,000.
5. National Science Foundation's *regular grant,* for the period 1987-1990, for a total amount of about $190,000.
6. Equipment grant of $12,000 from AT&T Bell Laboratories, for digital filter design laboratory associated with a graduate level course, at the EE Dept., Caltech.
7. Matching funds for NSF PYI from:
   a) Pacific Bell: $10,000.00.
   b) General Electric: $10,000.00.
   c) Hughes Aircraft: $12,500.00.
   d) AT& T: Equipment worth about $8,000.00.
   e) Rockwell International: $20,000.00.
   f) Tektronix, Inc. $21,000.00, 1991.
8. NSF regular grant for the amount $243,713, for the period 1990-1993.
9. Cash grant for research, Tektronix, Inc., $ 25,000.00, 1992.
10. Cash grant for research, Tektronix, Inc., $ 25,000.00, 1993.
11. Cash grant for research, Rockwell Intl., $ 25,000.00, 1993.
12. NSF regular grant for the amount $174,000, for the period 1993-1996.
13. ONR regular grant for the amount $194,673, for the period 1993-1996.
14. ONR regular grant for the amount $392,155, for the period 1996-1999.
15. Cash grant for research, Tektronix, Inc., $ 30,000.00, 1996.
16. NSF regular grant for the amount $360,000, for the period 1997-2000.
17. ONR regular grant for the amount $389,167, for the period 2001-2004.
18. ONR regular grant for the amount $361,192, for the period 2005-2008.
19. NSF regular grant for the amount $271,696 for the period 2004-2007.
20. NSF small-exploratory-grant for the amount $89,527 for the period 2006-2007.
17. ONR regular grant for the amount $538,502, for the period 2008-2011.