

## CURRICULUM VITAE - to April 2006

### Name, Position, Academic Department

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### Education

**B.S.** Trinity College, Hartford, CT, 1965 (with Honors in Engineering)

**B.S.E.** Trinity College, Hartford, CT,1966

**Sc.M.** Brown University, Providence, RI, 1968

**Ph.D.** Brown University, Providence, RI, June 1970 - Requirements completed and certified, June 1970 – Formal awarding of degree June 1971 (Both degrees in the Division of Engineering - Electrical Sciences.)

### Doctoral Dissertation(for Prof. Allan E. Pearson):

“Identification of Linear Systems Using Fast Fourier Transform Techniques”

### Professional Appointments

**September 1980-** Professor of Engineering, Brown University, Providence, RI, responsible for new program in Computer Engineering. Director of LEMS Laboratory. Responsible for research programs in speech and signal processing and computer architecture. Have taught courses in digital signal processing, speech processing, communication theory, computer architecture, electrical circuits, and introduction to programming.

**July 1991-June 1998** Dean of Engineering, Brown University

**1988-1990** Director of Undergraduate Engineering Programs, Brown University

**1976-1980** IBM, T. J. Watson Research Center, Yorktown Heights, NY, Manager of Speech Terminal Project, responsible for design and development of real-time speech I/O system.

**1972-1976** IBM, T. J. Watson Research Center, Yorktown Heights, NY, Digital signal processing techniques for speech recognition. Responsible for design of speech analysis, recording, display facility.

- 1971-1972** IBM, T. J. Watson Research Center, Yorktown Heights, NY, Analytic methods of computer system performance.
- 1970-1971** IBM, T. J. Watson Research Center, Yorktown Heights, NY, Digital image processing methods as applied to earth resources satellite data.
- 1968** (part-time) - Consultant to the Raytheon Company Submarine Signal Division, Portsmouth, RI.  
Subject: Specific Applications of FFT Techniques.
- 1966-1970** Teaching Assistant, Brown University, complete responsibility for the Microwave and Digital Electronics Laboratories of the Electrical Sciences Department of the Division of Engineering. Also, advisor for seven senior honors projects in digital signal processing.
- 1964-1966** Research Associate at the Gerber Scientific Instrument Co. (part-time and summers) Hartford, CT. Worked in the area of development of logic and control for large digital plotting systems.

## Research in Progress

*Systems* Under Janci Foundation support, I am continuing the project for microphone-array controlled teleconferencing as well as the work on large-aperture microphone arrays. Presently submitting a patent and have interest from several companies.

*Acoustics* Developed the most complete "talker in a room" simulator to date. It includes a model for the source transfer function and can be used for orientation experimentation.

*Acoustics/Algorithms* Developing algorithms to determine the orientation of a talker from large-aperture array microphone signals. New paper nearly complete.

*Talker characterization* Developing new algorithms and paradigms for correctly characterizing talkers from noisy large-aperture microphone-array data.

*systems* Am building a new large microphone array system based on Analog devices parts and gifts. Boards are being populated and expect working version in 2006.

(arrays) (with Joe Mundy) Continued research and am submitting proposals for combining large parabolic microphone receivers with cameras to acquire sound at extremely long distances. The camera, among other uses, must be used to determine distortions due to changes in the speed of sound in the outdoor environment.

(Acoustics) Under Microsoft support (with Iris Bahar) developing a lifelike "talking head" with full facial movement. The purpose is to be used as a human-like repeatable source for testing our arrays.

(*Systems*) Brown has licensed a startup called Acoustic Magic that has been delivering arrays based on our technology for untethered speech entry to a workstation. License fees from this have been distributed a couple of times already adding to support for my research, Engineering endowment and University endowment.

## Service to the University and Profession (i) University

On faculty search Committee for Computer Engineering replacement for Jie Chen

In charge of Admissions folder reading for the Division [2005 - 6]

Faculty person for Brown Charities Drive [2004-5]

Freshman advisor 2004

Responsible for full preparation of ABET Self-Study for Computer Engineering and as liaison for Computer Engineering in November 2004 visit.

**2003-2005** Serving on ACCRI, Brown's formal committee on socially-responsible investing (appointed by FEC)

Manage and run LEMS facility [1981-]  
On two search committees for computer engineering hire [2003]  
Freshman advisor 2003  
Chair Tenure review Committee for R. Iris Bahar [2002]  
Chair search committee for new Computer Engineering professor [spring 2002]  
Directed a group of 12 students who worked on the Instron Simulator[2002]  
Barus-Holley Lobby redesign committee [2001-2002]  
Advisor for new project with Instron simulator [2000-2001]  
Chair search committee for new Computer Engineering professor 2001  
Advisor for new project with Instron simulator [2000-2001]  
Freshman advisor [2000] and Computer Engineering concentration advisor [Fall 2000]  
Chair search committee for new Computer Engineering professor [2000]  
Chair search committee for new Computer Engineering professor [1999]  
Chair *ad hoc* committee on rapid prototyping for the Division[1997-  
Freshman advisor [1999]  
New Engineering Building Committee[1997-  
University Red Tape Clearance Committee [1998-2001]  
Fund raising for new Brown Engineering facility.  
Member of Committee on Engineering Sesquicentennial(1995-1997)  
NCAA Accreditation Executive Committee and Chair of subcommittee on Governance and  
Compliance (1996-1997)  
Average advising – 5 independent studies students/year, 12 graduate students per year.  
Dean of Engineering [July 1991- June 1998]  
Director of LEMS [1981-  
Director of Undergraduate Programs, Division of Engineering [1988-1990]  
Chairman - Search Committee for EE [1989-90]  
Chairman - Search Committee for EE [1987-88]

Chairman - Search Committee for EE [1985-86]

Chairman - Search Committee for EE [1984-85]

Freshman/sophomore advisor - 2 of each three years

(ii) Profession

Average Refereeing per Year – 3 papers

Proposals reviewed per year – 3

NSF Panels per year – 1

(ii) Professional Activities

Fellow IEEE

Member, Trinity College Engineering Advisory Council [1990 - ]

Consultant for AT&T-Lucent on Patent Infringement suit, re. speech recognition [1998-

Chairman, Technical Committee on Digital Signal Processing [1979-83].

Member, IEEE Acoustics, Speech and Signal Processing Society, Technical Committee on Digital Signal Processing [1972-83].

General Chairman, IEEE International Conference on Acoustics, Speech and Signal Processing [1977]

Technical Advisor - Sphere Technology [1983-1985]

(iii) Community Activities

Member of Executive Committee, Trustees, Trinity College [2001-2003]

Charter Trustee, Trinity College, Hartford, CT [1994-2003 ]

**Academic Awards and Grants**

Academic Honors

Appointed member of Trinity Trustees Executive Committee 2001

Citation as an “Outstanding Engineering Alumnus”, Trinity College 100th Anniversary of Engineering, 1997

Elected IEEE Fellow, December 1996

Elected Charter Trustee of Trinity College, Hartford, CT (1994-2003)

Elected as a Tau Beta Pi member as an educator 1994

Nominated for 1994 Computerworld Smithsonian Award

IEEE Centennial Medal Award - 1984

IEEE ASSP Society Meritorious Service Award - 1981

IBM First Level Patent Award - 1976

IBM Outstanding Contribution Award for the MAP Acoustic Processor for continuous speech recognition - 1976

IBM Research Division Award for developmental work on Winograd Fourier Transform Algorithms - 1975

IBM Research Division Award for Sequential Similarity Detection Algorithms -1973

#### Grants and Contracts

Current, Pending

Nothing current or pending

#### Completed Awarded Funding

**2005** \$50,000 unrestricted, zero overhead gift from the Janci Foundation received to support my research into microphone array controlled video teleconferencing.

**2005** LEMS affiliate interface for Analog Devices \$35,000

**2004** \$50,000 unrestricted, zero overhead gift from the Janci Foundation received to support my research into microphone array controlled video teleconferencing.

**2004** LEMS affiliate interface for Analog Devices \$35,000 [2003]

**2004** License fees and royalties from Microphone Array patents from Acoustic Magic \$10,000.

Unrestricted \$25,000 grant [2003] (with Iris Bahar) from Microsoft to support summer students and research on the talking android head. item \$35,000 [2002] unrestricted, zero overhead gift from the Janci Foundation received to support my research into microphone array controlled video teleconferencing.

**2003** \$25,000 unrestricted, zero overhead gift from the Janci Foundation received to support my research into microphone array controlled video teleconferencing.

LEMS affiliate interface for Analog Devices \$35,000 [2003]

License fees and royalties from Microphone Array patents from Acoustic Magic[2003] \$7,000.

Unrestricted \$25,000 grant [2003] (with Iris Bahar) from Microsoft to support summer students and research on the talking android head. item \$35,000 [2002] unrestricted, zero overhead gift from the Janci Foundation received to support my research into microphone array controlled video teleconferencing.

\$5000 [2002] gift from Santo Politi of Charles River Associates to support a summer student.

License fees and royalties from Microphone Array patents released in 2002 of an additional \$40,000.

\$50,000 unrestricted, zero overhead gift from the Janci Foundation received to support my research into microphone array controlled video teleconferencing.

LEMS affiliate interface for Analog Devices \$35,000 [2001]

License fees and royalties from Microphone Array patents released in 2001 of an additional \$450,124.

\$100,000 unrestricted, zero overhead gift from the Janci Foundation received to support my research into Microphone Arrays for Speech Recognition

LEMS affiliate interface for GTECH - \$35,000 [1998-2000]

LEMS affiliate interface for Analog Devices \$35,000 [1995-2000]

License fees and royalties from Microphone Array patents have generated about \$1,250,000 over 1998-2000, with about \$200,000 going to support my research, about \$200,000 each going to Divisional and LEMS endowments.

NSF Grant for Parallel Architectures for Speech Recognition approx \$300,000 [1995-1998]

NSF Teaching Equipment Grant for \$81,000 for undergraduate workstations [1995-1997]

CRASP/DARPA grant for \$50,000 [1996]

Experimental Systems NSF grant (with James Flanagan of Rutgers) for building large microphone array - approx. \$ 1,000,000 [1994-1996].

DARPA grant with David Cooper for Target Recognition approx. \$350,000 [1993-1995]

NSF Grant for Parallel Architectures for Speech Recognition approx. \$300,000 [1992-1994]

NSF Grant (with S. Ghosh) on Reconfigurable Computing approx \$170,000 [1991-1992]

NSF/DARPA Grant on Microphone Array Technology approx \$300,000 [1989-1991]

NSF Grant for Parallel Architectures for Speech Recognition approx \$350,000 [1989-1991]

NSF Grant for Parallel Architectures for Speech Recognition approx \$566,000 [1986-1988]

NSF Grant for Parallel Architectures for Speech Recognition approx \$400,000 [1982-1985]

ARO (DOD) Equipment Grant (with D. B. Cooper) approx \$122,000 [1983]

NSF Equipment Grant (with D. C. A. Bulterman) approx \$108,000 [1982]

Hewlett-Packard Equipment Grant \$500,000 [1989]

BERTEX Interface for Division:\$5000 each from A.T. Cross[1992], Schroff[1992-95], Hasbro[1992-94],Telco/Metrabyte[1993-95],American Power Conversion [1993-95], Gtech[1992-95], Cookson America [1992-95],NUWC[1993-95], Narragansett Electric[1994-95], Astro Med[1994-95], Augat[1995], Texas Instruments[1996], Gorham[1996]

LEMS affiliate interface for Polycom - \$25,000 [1998]

LEMS affiliate interface for VTEL - \$35,000/year [1994-96]

LEMS Affiliate interface for GTECH - \$18,000/year [1987-1989] \$36,000/year [1990-1994]

LEMS Affiliate interface for Sanders Associates - \$30,000/year [1984-1991], \$20,000 [1992], \$10,000 [1993], \$20,000[1994-95]

LEMS Affiliate interface for Bellcore - \$30,000/year [1990-1991] \$15,000 [1992]

LEMS Affiliate interface for AT&T - \$30,000/year [1984-1985] \$35,000/year [1987- ]

LEMS Fellowship sponsored by Metrabyte \$15,000 [1992]

LEMS Affiliate interface for AMP - \$30,000/year [1984-1988] \$35,000/year [1991]

LEMS Affiliate interface for US West - \$35,000/year [1988]

Analog Devices Grant for Student Research Projects Program and Affiliation \$175,000 [1988-1992] (only \$105,000 received).

Analog Devices grant for Advasnced Grad Student/Post-Doc Support \$125,000 [1988-1992] (only \$75,000 received).

Analog Devices Grant (with D. B. Cooper) \$150,000 [1982-87]

IBM Fellowships 3 years - \$60,000 (J. T. Rayfield) [1984-1987]

LEMS Affiliate interface for Augat - \$30,000/year [1984-1988] (\$60,000 cash, and \$60,000 parts and services)

LEMS Affiliate interface for IBM - \$25,000/year [1984 - 1985]

IBM New Research Grant, \$75,000 [1981-84]

GLAK Grant, \$5,000 [1982]

Gould, Inc. (with D. C. A. Bulterman), \$15,000 [1984]

Tektronix Matching Grant \$15,000 [1985].

Equipment donations from Motorola, National Semiconductor, TI, Monolithic Memories, Augat, AT&T, Schroff, AMD, Viewlogic, Xilinx.

## 9. Teaching

### Last Three Years

- 2005
  - (Fall) EN253 – Digital Signal Processing – 13 students (95% of course)
  - (Fall) EN193S09 – Embedded Systems – 8 students – 10% of course
  - (Spring) EN52 – 54 students – upgraded two labs as well (with G. Taubin)
  - (Spring) ScM Theses directed and completed – 1
  - (Spring) Undergraduate Honors Theses directed and completed – 3
  - (Spring) EN196 Independent studies students directed – 4
- 2004
  - (Fall) EN253 – Digital Signal Processing – 13 students
  - (Fall) EN195 – Undergraduate independent studies – 2 students
  - (Spring) EN52 – Electric Circuits (by myself)
  - (Spring) EN196 – Independent Studies – 2 students
  - (Spring) PhD students completing – 1
- 2003
  - (Fall) EN253 – Digital Signal Processing – 13 students
  - PhD Students directed – 2
  - (Fall) EN195 – independent studies students directed – 2
  - (Spring) EN254 – Speech Processing – 5 students
  - (Spring) ScM Theses completed – 1
  - (Spring) EN196 – Independent Studies students directed – 3

### Summary of Courses Taught

In Spring 2004, I had 100% responsibility for EN52, an 80 student course with sections and labs. I developed and introduced a new controls lab and severely modified the large speaker design lab to accommodate the timing. In the fall of 2003 I developed and introduced a

new design course on embedded microprocessor systems, EN193-S09 that finished with 7 undergraduates.

Engineering 193-S09 Embedded Microprocessor System Design[2003,in part, 2005] 7 students

Engineering 253 Digital Signal Processing [1980 - 1985, 1987-1991, 1993,1994,1997,1999-2002,2004-2005] (average = 14 students)

Engineering 52 Circuit Theory and Optics [1986,1991,1999,2000,2001,2003,2004,2005] (average = 80 students)

Engineering 164 Computer Systems and Architecture [1981-82, 1988,1990] (average = 75 students)

Engineering 254(formerly 292A) Speech Processing [1983,1985,1989,1991,1993,1996,1998,2001,2004] (average = 7 students)

Engineering 10 Engineering Programming [1983] - 170 students

Engineering 158 Communication Theory [1984,1985] (average = 40 students)

Engineering 195/196 Independent Studies 1980–present Average 6 Independent Studies student-semesters per year; Average of 2 Completed Honors' Theses (1980-present)

### **Honors Students receiving NSF Fellowships**

Michael Brandstein - 1988

Henry Chang - 1989

### **PhD's Awarded**

Joshua Sachar[2004]

Tadd Hughes[2001]

John Adcock[2001]

Joseph Dibiase[2000]

Paul Meuse[2000]

Douglas Sturim[1999]

Stuart Kirtman[1998]

Aaron Smith [1998]

Daniel Mashao [1996]

Yoshihiko Gotoh [1996]  
Michael Wazlowski [1996]  
Michael Brandstein [1995]  
Jonathan Foote [1994]  
Michael Hochberg [1993]  
Peter Athanas [1992]  
Les Niles [1991]  
Krishna Nathan [1991]  
Victor Alvarado [1990]  
James Rayfield [1988]  
Susan Miller [1988]  
David Morgan [1988]  
Yi Teh Lee [1988]

### **Masters' Degrees Awarded**

Michael Herman[2005]  
Sheldon Provost[2004]  
Ying Yu[2003]  
Matthew Sousa[2002]  
Joshua Sachar[2000]  
Michael Snyder [1999]  
Hyun Kyu Yun [1997]  
Hong-Seok Kim [1997]  
James Kessler[1996]  
Laurie Chapman[1994]  
Mark Rapaport [1993]  
John Adcock [1993]

Joseph DiBiase [1993]  
Michael Wazlowski [1992]  
Yoshihiko Gotoh [1991]  
Michael Blaine [1990]  
Michael Curran [1990]  
Gregory Leeming [1989]  
Michael Hochberg [1989]  
Hamid Wasti [1989]  
Tracey Jones [1988]  
Michael Karam [1987]  
Elizabeth Wilson [1986]  
James Rayfield [1985]  
Susan Miller [1985]  
David Morgan [1985]  
Esther Ovadia [1985]  
Wendy Kessler [1984]  
Jay Rubinstein [1983]  
Larry Lewis [1983]  
Zwei Amitai [1983]  
Les Niles [1983]  
Carolyn Vickroy [1982]  
David Hackman [1982]  
Dominic Dominijanni [1982]

### **Recent Undergraduate Honors Theses**

Sarah Kline[2005]  
Brendan Schwartz [2005]

Jacob Rosenstein [2005]

Evan Metcalfe [2003]

George Roberts[2003]

Noel Eisley [2002]

Kevin Wu [2002]

### **Current PhD Graduate Students**

Hoang Do

Avram Levi

Matthew Gillette

Ying Yu

### **Current ScM Graduate Students**

Daniel Casimiro

### **Current Undergraduate Independent Studies/Honors Students**

David Gal

Yoshiro Fujita