

ATTACHMENT
Responses to THECB Letter Dated May 2, 2008

1. Are recruitment efforts sufficiently broad to include a sustained recruitment effort for women into the program?

Our recruitment efforts target underrepresented minorities such as African Americans, Hispanic and females. We have been using the following strategies to recruit students into the doctoral program:

- (i) Faculty members visit universities in Texas and outside the state of Texas to recruit students.
- (ii) Faculty members use funded projects to attract students into the doctoral program
- (iii) Faculty members are recruiting National Science Foundation Bridge-to-Doctorate Program students into the doctoral program.
- (iv) Faculty members have submitted and continue to submit proposals to obtain funding for prospective graduate students

In addition, we are initiating a 5 year BS/MS program in the College of Engineering. This initiative will increase the number of students with Master of Science in Electrical Engineering who might have interest in pursuing the PhD in Electrical Engineering program.

2. We also note that two students were reported as advanced to candidacy, and that the program has produced one graduate. Please send us information about the placement of that graduate, and whether any other students in the program have advanced to candidacy since 2005-2006.

The August 2007 graduate of the program, Dr. Song, is currently working as an engineer at Brocade Communications Systems, Inc. The company is an industry leader in data center networking solutions and services. It is based in Silicon Valley.

Since August 2007, three additional students have been advanced to candidacy. The students are Nana Ampah (advanced to candidacy in December 2007), Haixin Wang (advanced to candidacy in December 2007) and Olusegun Odejide (advanced to candidacy in May 2008). The two other students who were previous mentioned are Dr. Ning Song (advanced to candidacy in December 2006, and graduated in December 2006) and Mr. Cary Smith (advanced to candidacy in January 2007).

3. The report indicates that forty refereed journal papers have been published by faculty since approval of the program. We would like to see a listing by faculty member of those publications.

The publication listings are arranged by faculty name in alphabetical and reverse chronological order as requested. Some publications are duplicated from one faculty member to another due to multiple authors.

Dr. Cajetan Akujuobi

1. M. N. O. Sadiku, C.M. Akujuobi, S.M. Musa, and S. R. Nelatury, "Analysis of time-dependent cylindrical problems using Monte Carlo," *Microwave and Optical Technology Letters*, vol. 49, no. 10, Oct. 2007, pp. 2571-2573.
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3. Akujuobi, C. M.; Ampah, N. K.; Sadiku, M. N.O. "Application of Wavelets and Self-similarity to Enterprise Network Intrusion Detection and Prevention Systems", *Proc. of 11th. Annual IEEE International Symposium on Consumer Electronics (ISCE)*, June, 2007.
4. C. M. Akujuobi, N. K. Ampah, and M. N. O. Sadiku, "An intrusion detection technique based on change in Hurst parameter with application to network security," *International Journal of Computer Science & Network Security*, vol. 7, no. 5, May 30, 2007, pp. 55-64.
5. S. M. Musa, M. N. O. Sadiku, and C. M. Akujuobi, "S-Parameters for three and four two-port networks," *Technology Interface*, vol. 7, no. 2, Spring 2007.
6. M. N. O. Sadiku, C.M. Akujuobi, S.M. Musa, and S. R. Nelatury, "Direct Monte Carlo Simulation of Time-dependent Problems," *Technology Interface*, Fall 2007.
7. Matthew N.O. Sadiku and Cajetan M. Akujuobi, Chapter 14 – Computer Networks, "Computers, Software Engineering, and Digital Devices; in *The Electrical Engineering Handbook*, 3rd ed., Edited by Richard C. Doff, CRC, 2006, pp.14.1-14.18.
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Dr. Annamalai Annamalai

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Dr. John Attia

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Dr. Lijun Qian

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Dr. Mathew Sadiku

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Dr. Dhadesugoor Vaman

1. "Cross – Layer Distributed Power Control and Scheduling for Delay – Constrained Applications over CDMA – based Wireless Ad Hoc Networks", IEEE Transactions on Communications, Accepted for Publications (To appear in IIQ 2008).
2. "Cognitive Radio Based Multi-User Resource Allocation in Mobile Ad Hoc Networks using Multi-Carrier CDMA Modulation", IEEE Journal of Selected Area Communications (IEEE JSAC) Special Issue on Cognitive Radios, Vol. 26, No. 1, January 2008, pp 70 – 82.
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4. "Power Control and Scheduling with Minimum Rate Constraints in Clustered TD/CDMA Wireless Ad Hoc Networks", John Wiley Journal on Wireless Communications and Mobile Computing, fall 2006, pp 791-808.
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Dr. Richard Wilkins

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4. You indicate that nineteen grants/contracts were initiated since approval of the program or, if awarded prior to the program approval date, were continued beyond the date of the program approval. By contrast, student research and professional activities are relatively modest, although additional information could clarify the nature of the six student publications and two student awards cited.

The publications listings are arranged by students' name in alphabetical and reserve chronological order. Some publications are duplicated between students and/or faculty members due to multiple authors.

(a) The student publications are as follows:

Mr. N.K. Ampah (advanced to candidacy in 2007)

1. Akujuobi, C. M.; Ampah, N. K.; Sadiku, M. N.O. "Application of Wavelets and Self-similarity to Enterprise Network Intrusion Detection and Prevention Systems", Proc. of 11th. Annual IEEE International Symposium on Consumer Electronics (ISCE), June, 2007.
2. C. M. Akujuobi, N. K. Ampah, and M. N. O. Sadiku, "An intrusion detection technique based on change in Hurst parameter with application to network security," International Journal of Computer Science & Network Security, vol. 7, no. 5, May 30, 2007, pp. 55-64.
3. Akujuobi, C. M.; Ampah, N. K.; Sadiku, M. N.O. "Application of Signal Detection and Estimation Theory to Network Security", Proc. of 11th. Annual IEEE International Symposium on Consumer Electronics (ISCE), June, 2007. (Published)

Mr. Shuza Binzaid

1. Shuza Binzaid, John O. Attia, "Configurable Active-Region-Cutout-Transistor for Radiation Hareded Circuit Applications", IEEE Canadian Conference on Electrical and Computer Engineering, May 2008, Page(s) 1215-1218.
2. Shuza Binzaid, John O. Attia, Ron D. Schrimpf, "Enclosed Layout Transistor with Active Region Cutout", Pbasics2 Region 5 Conference, April 2008, Page(s) 22-26.
3. Shuza Binzaid, John O. Attia, Ron D. Schrimpf, "Biased Active Region Cutout Transistor (BARCET) Apparatus for Ultra-Low Leakage Current in Radiation

- Environments”, USPTO, US Provisional Patent Granted (Patent # 61/062,116), 3 March, 2008.
4. Shuza Binzaid, John O. Attia, Ron D. Schrimpf, “Active-Region-Cutout-Transistor (ARCT) Apparatus for Minimizing Leakage Current in Radiation Environments”, USPTO, US Provisional Patent Granted (Patent # 61/004,429), 5 February, 2008.

Mr. Song Gao

1. S. Gao, L. Qian, and D.R. Vaman (2008). “Energy Efficient Adaptive Modulation in Wireless Cognitive Radio Ad Hoc Networks”, IEEE Workshop on Networking Technologies for Software Defined Radio (SDR) Networks, San Francisco, CA.
2. S. Gao, L. Qian, and D.R. Vaman (2008). “Distributed Energy Efficient Spectrum Access in Wireless Cognitive Radio Sensor Networks”, IEEE Wireless Communications and Networking Conference (WCNC), Mar 2008, Las Vegas, NV.
3. S. Gao, L. Qian, and D.R. Vaman (2008). “Energy-Efficient Resource Allocation in Cognitive Radio Ad Hoc Networks”, IEEE Sarnoff Symposium, Apr. 2008, Princeton, NJ.
4. S. Gao, Q. Qu, L. Qian, and D.R. Vaman (2007). “Energy Efficient Adaptive Modulation in Wireless Cognitive Radio Sensor Networks”, IEEE International Conference on Communications (ICC), June 2007, Glasgow, Scotland.

Mr. Odejide (advanced to candidacy in 2008)

1. C. Akujoubi, O. Odejide, A. Annamalai, and G. Fudge, "Sparseness Measures of Signals for Compressive Sampling," *Proc. 7th IEEE International Symposium on Signal Processing and Information Technology (ISSPIT'07)*, Cairo, December 2007, pp. 1042-1047.

Mr. Cary Smith (advanced to candidacy in 2007)

1. Cary Smith, Cajetan M. Akujuobi, Kurt Kloesel and Phil Hamory, An Approach to Vibration Analysis Using Wavelets in an Application of Aircraft Health Monitoring, *Journal of Mechanical Systems and Signal Processing*, Accepted for Publication June 16, 2006, Ref. # MSSP05-189R2, Elsevier, 2006.

Dr. Ning Song (graduated in 2007)

1. Lijun Qian, Ning Song, and et. al, "Detection of Wormhole Attacks in Multipath Routed Wireless Ad Hoc Networks: A Statistical Analysis Approach", *Journal of Network and Computer Applications*, vol.30, pp.308-330, 2007.
2. Lijun Qian, Ning Song, and et. al, "Secure Anonymous Routing in Clustered Multihop Wireless Ad Hoc Networks", in *Proceeding of IEEE Conference on Information Sciences and Systems (CISS 2006)*, Mar 22-24, Princeton, NJ.
3. Lijun Qian, Dhadesugoor R. Vaman, and Ning Song, "QoS-Aware Maximally Disjoint Routing in Power Controlled Multihop CDMA Wireless Ad Hoc Networks", *EURASIP Journal on Wireless Communications and Networking*, special issue on Wireless Mobile Ad Hoc Networks, 2007.
4. Lijun Qian, Ning Song, Dhadesugoor R. Vaman, and et. al, "Joint Power Control and Maximally Disjoint Routing for Reliable Data Delivery in Multihop Wireless Ad Hoc Networks", in *Proceeding of IEEE Wireless Communications and Networking Conference (WCNC 2006)*, Apr 2-6, Las Vegas, NV.
5. Lijun Qian, Ning Song, Dhadesugoor R. Vaman, and et. al, "Power Control and Proportional Fair Scheduling with Minimum Rate Constraints in Clustered Multihop TD/CDMA Wireless Ad Hoc Networks", in *Proceeding of IEEE Wireless Communications and Networking Conference (WCNC 2006)*, Apr 2-6, Las Vegas, NV.
6. Lijun Qian, Ning Song, and X. Li, "SARC: Secure Anonymous Routing for Cluster based MANET", book chapter in *Wireless Communications Research Trends*, pp.55-81, Nova Science Publishers, Inc. 2007.
7. Lijun Qian, Ning Song, and et. al, "Detecting and locating wormhole attacks in wireless ad hoc networks through statistical analysis of multi-path", in *Proceeding of IEEE Wireless Communications and Networking Conference (WCNC 2005)*, New Orleans, LA.
8. Ning Song, Lijun Qian and et. al, "Wormhole Attacks Detection in Wireless Ad Hoc Networks: A Statistical Analysis Approach", in *Proceeding of The 1st International Workshop on Security in Systems and Networks (SSN 2005)*, Apr 2005.

Mr. Haixin Wang (advanced to candidacy in 2007)

1. Qian, L., H. Wang, and E. Dougherty (2008). "Inference of Noisy Nonlinear Differential Equation Models for Gene Regulatory Networks using Genetic Programming and Kalman Filtering", IEEE Transactions on Signal Processing, Vol.56, No.8.
2. Qian, L., and H. Wang (2007). "Inference of Genetic Regulatory Networks by Evolutionary Algorithm and H_infinity Filter", (invited paper) IEEE Statistical Signal Processing Workshop, Aug 2007.
3. Wang, H., L. Qian, and E. Dougherty (2007). "Modeling Genetic Regulatory Networks by Sigmoidal Functions: A Joint Genetic Algorithm and Kalman Filtering Approach", IEEE ICNC 2007.
4. Wang, H., L. Qian, and E. Dougherty (2007). "Inference of Gene Regulatory Networks using S-System: A Unified Approach", IEEE CIBCB 2007.
5. Wang, H., L. Qian, and E. Dougherty (2006). "Inference of Gene Regulatory Networks using Genetic Programming and Kalman Filter", IEEE Gensips 2006.

(b) The students' awards are as follows:

Emad Awada, PhD student, won the second place award (Engineering) at the 2006 TAMUS Pathways Symposium (November 10 -11, 2006) for his paper titled *Wavelet-Based ADC Mixed Signal Testing*.

Cary Smith, PhD student, won the third place award (Engineering) at the 2006 TAMUS Pathways Symposium (November 10 -11, 2006) for his paper titled *Novel Technique for Vibration Detection using Wavelets for the Pathfinder Plus Aircraft*.

(c) Please note a correction: Total Amount of Funded Doctoral Research Projects was \$5,610,214 instead of \$56 Million as reported in your letter. *The three-year report is attached.*

5. One challenge for this program is to increase the number of students enrolled in the program to take advantage of the faculty.... Please send more information regarding current enrollments and recruitment initiatives upon receipt of this letter.

The fall 2007 enrollment was 13 and the spring 2008 was 12. It should be noted that there were 5 part time students (Willie Walters, AHM Zaman, Mahmud Mohammed, Supriya Kher, Alam Shumon), who were not enrolled. Three of the part-time students have successfully passed the preliminary examinations of the program.

In addition to the recruiting strategies mentioned earlier; we have performed the following recruitment activities during the fall 2007 and spring 2008 semesters:

- Faculty member visited TAMU-Kingsville to recruit graduate students.
- A faculty member visited Tuskegee University to recruit graduate students.
- Three Master of Science students from Tuskegee University visited Prairie View A&M University to look at our facilities and talk to graduate faculty.
- Faculty member attended the National Society of Black Engineers conference to recruit graduate students.
- Electrical and Computer Engineering faculty gave two presentations to students about going to graduate school.
- The Master of Science students who graduated during the 2007-2008 academic year were strongly recruited to continue their doctoral degrees at Prairie View A&M University.
- An ad hoc committee was formed to identify methods of increasing the graduate enrollment in the Department of Electrical and Computer Engineering.
- The College of Engineering is considering 5 year BS/MS program to increase the MS students enrollment and provide larger pipeline of students who want to pursue the terminal degree in Electrical Engineering.
- The College of Engineering at PVAMU applied and was accepted to become member of GEM (Graduate Education for Minorities) Consortium school. This will allow students nationwide to pursue graduate studies at PVAMU with fellowship from industry.
- A faculty member attended the GEM conference to recruit students.
- A faculty member attended the National Symposium for Advancing Women and Underrepresented in Academy to present paper and recruit students.
- Two faculty members attended the IEEE Region 5 conference to present paper and recruit students.
- \$5 Million proposal was submitted to NSF to (i) establish NSF CREST Center at PVAMU, (ii) to perform state-of-the art research and (iii) to obtain funding for graduate students, especially PhD students in Electrical Engineering.

6. The addition of six new faculty members since program approval in 2003, and two additional lines available, represents significant progress in faculty available to contribute to the doctoral program. One final point remains: the faculty vitae of those new faculty members who have been hired since program approval were not included with the report. Please submit them upon receipt of this letter, along with other materials requested.

Attached are the vitae of the faculty hired since program approval:

VITAE OF

Dr. Annamalai Annamalai
Dr. Franklin Nkansah
Dr. James Northern
Dr. Lijun Qian
Dr. Matthew Sadiku
Dr. Dhadesugoor Vaman

Curriculum Vitae for Annamalai Annamalai Jr.

Prairie View A&M University
Department of Electrical and Computer Engineering

I. EDUCATION

Ph.D., Electrical and Computer Engineering, University of Victoria, Canada, 01/1997 - 01/1999
Dissertation: *Efficient Analysis of Wireless Digital Communication Systems in Multiuser and Multipath Fading Environments*

M.A.Sc., Electrical and Computer Engineering, University of Victoria, Canada, 05/1995 - 01/1997
Thesis: *Issues in DS-CDMA Integrated Wireless Access Networks*

B.E. (1st Class Honors), Electrical and Computer Engineering, Science University of Malaysia, 09/1989 - 04/1993
Thesis: *Design and Development of a 4-Channel ECG and a Computerized Patient Monitoring System*

II. WORK EXPERIENCE

Associate Professor, ECE Dept., Prairie View A&M University (09/2006 - present)

Provide quality instruction at undergraduate and graduate levels, perform quality research and advising of graduate students in the area of wireless communications.

Taught a total of 7 courses (6 distinct courses) since Fall 2006

Graduate courses taught: ELEG 6303: Signal Detection and Estimation Theory - Fall 2006; ELEG 6233: Coding Theory - Spring 2007; ELEG 6353: Advanced Digital Signal Processing - Fall 2007; ELEG 6343: Advanced Signals & Systems - Spring 2008.

Undergraduate courses taught: ELEG 3013: Network Theory II - Fall 2006, Spring 2007; ELEG 3023: Signals and Systems - Fall 2007, Spring 2008.

Currently advising one graduate student as major advisor/co-advisor and one undergraduate (senior level) design team

Conduct research in the areas of waveform design for integrated voice/data networks, link adaptation, cooperative wireless communications, and compressive sensing in collaboration with other ECE faculty members in the ARO Center for Battlefield Communications (CeBCoM) and Center of Excellence for Communication Systems Technology Research (CECSTR)

Publication Accomplishments (after September 2006):

6 articles published/accepted for publication in refereed journals

10 papers published in refereed conference proceedings

Assistant Professor, Bradley Department of Electrical & Computer Engineering, Virginia Polytechnic Institute and State University (01/2000 - 08/2006). Also served as an Associate Director of Virginia Tech's Mobile and Portable Radio Research Group between 01/2002 - 05/2006 and affiliated with the VT-Advanced Research Institute.

Teaching Accomplishments

Taught a total of 18 courses (8 distinct courses) between 01/2000 and 06/2006

Graduate courses taught: ECE5656: Communications Systems Design II - Spring 2000, Summer 2001; ECE5655: Communications Systems Design I - Fall 2000, Fall 2001; ECE5544: Coding Theory - Spring 2001, Spring 2002, Fall 2005; ECE5664: Cellular Radio and Personal Communications - Fall 2001, Spring 2004; ECE5634: Information Theory - Fall 2002, Spring 2005; ECE5984: Special Topics in Communications: Orthogonal Frequency Division Multiplexing and Related Technologies - Spring 2003; ECE 5654: Digital Communications - Spring 2006.

Undergraduate courses taught: ECE3614: Introduction to Communication Systems

Developed a new graduate level course on Orthogonal Frequency Division Multiplexing (ECE5984) and updated ECE5544 and ECE5656 (cover the fundamentals of coded modulation, turbo coding principles, space-time processing and MIMO systems)

Directed 5 Ph.D. dissertations and 12 M.S.E.E. theses

Dean's List of Teaching Excellence: Fall 2005

Sponsored Research Accomplishments

Participated in 11 funded sponsored research projects totaling \$1,881,752

Principal Investigator on 4 research project totaling \$186,344 with a share of \$166,142 in direct support of my research efforts

Co-Principal Investigator on 7 research projects totaling \$1,695,408 with a share of \$344,438 in direct support of my research efforts

As an Associate Director of VT-MPRG, my personal share of the funding received through the MPRG industrial affiliate program (\$1,232,650 from 17 companies between 2002 and 2006) is \$246,530 and \$15,000 in committed funding for the subsequent year.

Dissemination of Research Results & Publication Accomplishments (prior to September 2006)

4 book chapters

44 articles published in refereed journals

60 papers published in refereed conference proceedings

7 tutorial presentations at major IEEE conferences on wireless communications, software-defined radio forum, and MPRG symposium

Post-Doctoral Research Fellow, ECE Dept., University of Victoria, Canada (02/1999 - 12/1999)

Conducted research on third-generation wireless cellular CDMA networks and the standardization of IMT-2000

Graduate Research Assistant, Canadian Institute for Telecommunications Research (a Federal Network of Centres of Excellence), University of Victoria, Canada (05/1995 - 01/1999)

Conducted research on air interface, error control coding and diversity techniques for CDMA integrated wireless access networks

Studied the design of simple receiver structures for high-speed indoor wireless communications

Developed a novel mathematical framework for the design and analysis of digital communication receivers over generalized fading channels

Developed a unified framework for evaluating the outage performance of cellular mobile radio systems

Investigated simple techniques to implement self-reconfigurable ARQ systems for enhanced communication data rates over slowly-varying channels

Studied robust packet combining mechanisms for improving the system throughput and delay performance of spread-spectrum packet radio networks

RF Design Engineer, R&D Department, Motorola (Land Mobile Products Sector), Malaysia (05/93 - 04/95)

Re-design and optimization of digital cordless phone transceivers for extended bands

Designed transmitter and power control circuitry for a 15W 800 MHz trunked mobile dispatch system and a 25W power amplifier for two-way VHF land-mobile radio

Modeling and simulation of RF circuits using Eesof Libra ECAD tools

Associate Engineer (industrial internship), Die-Fabrication and Testing Department, Hewlett Packard Inc., Optoelectronics Division, Malaysia (01/92 - 06/92)

Designed and installed an automatic inker for the visual die inspection area

Developed a production tracking software using C language with HP ISQL database

Electronic build design of beeper warning system for testing equipment

III. HONORS AND AWARDS

- 2008 Air Force Summer Faculty Fellowship
- 2001 IEEE Leon Kirchmayer Prize Paper Award
(awarded for the most outstanding paper in any publications of the IEEE by an author or authors of less than age thirty at the time of original manuscript submission)
<http://swww2.ieee.org/about/awards/pr/kirchpr.htm>
- 2000 NSERC Doctoral Prize
(only two awards presented annually in the field of engineering by the Natural Sciences and Engineering Research Council of Canada for outstanding originality and achievement in doctoral research in sciences and engineering at Canadian universities)
<http://www.nserc.ca/news/2000/p000216.htm>, <http://ring.uvic.ca/00mar03/wireless.html>
- 2000 CAGS/UMI Distinguished Dissertation Award in Natural & Health Sciences and Engineering
(only a single award presented annually in Canada by the Canadian Association of Graduate Studies and the University Microfilms International)
<http://www.cags.ca/awards/winners.html>
- 1998 IEEE Daniel E. Noble Graduate Fellowship
(only a single graduate fellowship award presented annually by the IEEE VTS and Motorola Inc.)
- 1998 Lieutenant Governor's Silver Medal
(awarded for top academic standing at master's degree level at the University of Victoria)
<http://ring.uvic.ca/98jun03/L-Silver.html>, <http://ring.uvic.ca/98jun03/Winners.html>
- 1998 IEEE ComSoc ICUPC'98 Student Paper Award
- 1997 Uniden Corporation Research Award (ICPWC'97 Student Paper Award)
- 1994 Motorola Recognition Award
- 1993 Best Electronics Project Award for the project entitled, "Design and Development of Computer Aided ECG" in the Intel Technology-USM Electronics Design Competition

IV. LIST OF PUBLICATIONS

(a) Book Chapters

- _____ 1. A. Annamalai, S. Muthuswamy, D. Sweeney, R. Buehrer, J. Ibrahim and Dong Ha, "Chapter 6: Receiver Design Principles" *An Introduction to Ultra Wideband Communication Systems*, Jeffrey H. Reed Ed., Prentice-Hall: 2005, pp. 253-377.
- _____ 2. D. Sweeney, Dong Ha, A. Annamalai and S. Muthuswamy, "Chapter 5: Transmitter Design" *An Introduction to Ultra Wideband Communication Systems*, J.H. Reed Ed., Prentice-Hall: 2005, pp. 213-251.
- _____ 3. C. Tellambura and A. Annamalai, "Wireless Communication Systems Design," *Wiley Encyclopedia of Telecommunications*, Vol. 5, J. G. Proakis Ed., John Wiley: 2003, pp. 2915-2925.
- _____ 4. A. Annamalai, C. Tellambura and V. K. Bhargava, "A Unified Approach to Performance Evaluation of Diversity Systems on Fading Channels," Chapter 17 in *Wireless Multimedia Network Technologies*, Kluwer Academic Publishers: Norwell, 1999, pp. 311-330.

(b) Archival Journals (Accepted/Published Papers)

- _____ 1. G. Deora, A. Annamalai and C. Tellambura, "Performance Evaluation of Generalized Selection Diversity Systems in Non-identical Rayleigh Fading Channels," accepted for publication in the *Wiley Journal on Wireless Communications and Mobile Computing*.

2. R. Viswanathan and A. Annamalai, "Performance Evaluation of Equal-Gain Diversity in Correlated Nakagami-m Fading," accepted for publication in the *IEE Proceedings on Communications*.
3. S. Gaur and A. Annamalai, "Moment Generating Function Based Performance Evaluation of Two Branch Equal Gain Combining Diversity Receivers over Correlated Nakagami-m Fading Channels," accepted for publication in the *IEEE Transactions on Vehicular Technology*.
4. S. Gaur and A. Annamalai, "Analysis of Dual-Diversity Coherent Equal Gain Combining in Nonindependent and Nonidentical Nakagami-m Channels," accepted for publication in the *Wiley Journal on Wireless Communications and Mobile Computing*.
5. R. C. Palat, A. Annamalai, J. H. Reed, "An Efficient Method for Evaluating Information Outage Probability and Ergodic Capacity of OSTBC System," *IEEE Communications Letters*, Vol. 12, No. 3, March 2008, pp. 191-193.
6. A. Annamalai, G. Deora and C. Tellambura, "Analysis of Generalized Selection Diversity in Wireless Channels," *IEEE Transactions on Vehicular Technology*, Vol. 55, No. 6, November 2006, pp. 1165-1175.
7. A. Annamalai, G. Deora and C. Tellambura, "Theoretical Diversity Improvement in GSC(N, L) Receiver with Nonidentical Fading Statistics," *IEEE Transactions on Communications*, Vol. 53, No. 6, June 2005, pp. 1027-1035.
8. A. Annamalai, C. Tellambura and V. K. Bhargava, "A General Method for Calculating Error Probabilities over Fading Channels," *IEEE Transactions on Communications*, Vol. 53, No. 5, May 2005, pp. 841-852.
9. J. Gaeddert and A. Annamalai, "Some Remarks on Nakagami-m Parameter Estimation using Method of Moments," *IEEE Communication Letters*, Vol. 9, No. 4, April 2005, pp. 313-315.
10. J. Gaeddert and A. Annamalai, "Further Remarks on Nakagami-m Parameter Estimators," *IEEE Communications Letters*, Vol. 9, No. 1, January 2005, pp. 22-24.
11. V. Ramanathan and A. Annamalai, "Analysis of Equal Gain Diversity Receivers in Correlated Rayleigh Fading Channels," *IEEE Communications Letters*, Vol. 8, No. 6, June 2004, pp. 362-364.
12. Y. Chen, C. Tellambura and A. Annamalai, "Unified Performance Bounds for Generalized Selection Diversity Combining in Independent Generalized Fading Channels," *Canadian Journal on Electrical and Computer Engineering: Special Issue on Advances in Wireless Communications and Networking*, Vol. 29, January/April 2004, pp. 7-14.
13. R. Mostafa, A. Annamalai and J. Reed, "Performance Evaluation of Cellular Mobile Radio Systems with Interference Nulling of Dominant Interferers," *IEEE Transactions on Communications*, Vol. 52, No. 2, Feb. 2004, pp. 326-335.
14. S. Gaur and A. Annamalai, "Some Integrals Involving Generalized Marcum Q-function with Applications to Error Probability Analysis of Diversity Receivers," *IEEE Transactions on Vehicular Technology*, Vol. 52, No. 6, Nov. 2003, pp. 1568-1575.
15. K. Vanganuru and A. Annamalai, "Combined Transmit and Receive Antenna Diversity for WCDMA in Multipath Fading Channels," *IEEE Communication Letters*, Vol. 7, No. 8, Aug. 2003, pp. 352-354.

16. S. Loyka, C. Tellambura, A. Kouki, A. Annamalai and F. Gagnon, "Comments on 'New Method of Performance Analysis for Diversity Reception with Correlated Rayleigh Fading Signals,'" *IEEE Transactions on Vehicular Technology*, Vol. 52, May 2003, pp. 725-726.
17. C. Tellambura, A. Annamalai and V. Bhargava, "Closed Form and Infinite Series Solutions for the MGF of a Dual-Diversity Selection Combiner Output in Bivariate Nakagami Fading," *IEEE Transactions on Communications*, Vol. 51, No. 4, April 2003, pp. 539-542.
18. A. Annamalai and C. Tellambura, "Performance Evaluation of Generalized Selection Diversity Systems over Nakagami-m Fading Channels," *International Journal on Wireless Communications and Mobile Computing*, Wiley, Vol. 3, No. 1, Feb. 2003, pp. 99-116.
19. A. Annamalai and C. Tellambura, "An MGF-Derivative Based Unified Analysis of Incoherent Diversity Reception of M-ary Orthogonal Signals in Independent and Correlated Fading," *International Journal of Wireless Information Networks*, Vol. 10, Jan. 2003, pp. 41-56.
20. Kiran Vanganuru and A. Annamalai, "Combined Transmit and Receive Antenna Diversity Schemes for WCDMA in Multipath Fading Channels," *Electronic Letters*, Nov. 2002, Vol. 38, pp. 1471-1472.
21. A. Annamalai and C. Tellambura, "Analysis of Hybrid Selection/Maximal-Ratio Diversity Combiners with Gaussian Errors," *IEEE Transactions on Wireless Communications*, July 2002, pp. 498-512.
22. A. Annamalai and V. Srivastava, "Outage Probability of Cellular Mobile Radio Systems with Selective Cochannel Interference Cancellation in an Overloaded Array Environment," *International Journal on Wireless Communications and Mobile Computing*, Vol. 2, June 2002, pp. 421-438.
23. T.S. Rappaport, A. Annamalai, R. M. Buehrer, and W.H. Tranter, "Wireless Communications: Past Events and a Future Perspective," *IEEE Communications Magazine*, 50th Anniversary Special Issue, May 2002, pp. 148-161.
24. C. Tellambura, A. Annamalai and V. K. Bhargava, "Unified Analysis of Switched Diversity Systems in Independent and Correlated Fading Channels," *IEEE Transactions on Communications*, Vol. 49, November 2001, pp. 1955-1965.
25. A. Annamalai, "The Effects of Gaussian Error in Selection Diversity Combiners," *Wiley Journal on Wireless Communications and Mobile Computing*, Vol. 1, November 2001, pp. 419-435.
26. A. Annamalai and C. Tellambura, "Cauchy-Schwarz Bound on the Generalized Marcum-Q Function with Applications," *Wiley Journal on Wireless Communications and Mobile Computing*, Vol. 1, March 2001, pp. 243-253.
27. A. Annamalai, C. Tellambura and V. K. Bhargava, "Simple and Accurate Methods for Outage Analysis in Cellular Mobile Radio Systems - A Unified Approach," *IEEE Transactions on Communications*, Vol. 49, No. 2, pp. 303-316, February 2001.
28. A. Annamalai and C. Tellambura, "Error Rates for Nakagami Fading Multichannel Reception of Binary and M-ary Signals," *IEEE Transactions on Communications*, Vol. 49, No. 1, pp. 58-68, January 2001.
29. H. Minn, M. Zeng, A. Annamalai and V. K. Bhargava, "An Efficient ARQ Protocol for Adaptive Error Control over Time-Varying Channels," *International Journal on Wireless Personal Communications*, Vol. 14, pp. 3-20, January 2001.

30. M. Zeng, A. Annamalai and V. K. Bhargava, "Harmonization of Global Third Generation Mobile Systems," *IEEE Communications Magazine*, December 2000, pp. 94-104.
31. C. Tellambura and A. Annamalai, "Further Results on the Beaulieu Series," *IEEE Transactions on Communications*, Vol. 48, No. 11, November 2000, pp. 1774-1777.
32. A. Annamalai, C. Tellambura and V. K. Bhargava, "Equal-Gain Diversity Receiver Performance in Wireless Channels," *IEEE Transactions on Communications*, Vol. 48, No. 10, pp. 1732-1745, October 2000 (nominated for the S. O. Rice prize paper award by Prof. Khaled Ben Letaief)
33. A. Annamalai and V. K. Bhargava, "Simple and Efficient Techniques to Implement a Self- Reconfigurable ARQ System in a Slowly Varying Mobile Radio Environment," *International Journal on Wireless Personal Communications: Special Issue on Intelligent Wireless Multimedia Systems, Terminals and Components*, Vol. 13, May 2000, pp. 97-117.
34. C. Tellambura and A. Annamalai, "Efficient Computation of $\text{Erfc}(x)$ for Large Arguments," *IEEE Transactions on Communications*, Vol. 48, No. 4, April 2000, pp. 529-532.
35. A. Annamalai, "Micro-Diversity Reception of Spread-Spectrum Signals on Nakagami Fading Channels," *IEEE Transactions on Communications*, Vol. 47, No. 11, Nov. 1999, pp. 1747-1756 (awarded the 2001 IEEE Leon K. Kirchmayer prize paper award).
36. A. Annamalai, C. Tellambura and V. K. Bhargava, "Exact Evaluation of Maximal-Ratio and Equal-Gain Diversity Receivers for M-ary QAM on Nakagami Fading Channels," *IEEE Transactions on Communications*, Vol. 47, No. 9, Sept. 1999, pp. 1335-1344.
37. A. Annamalai and V. K. Bhargava, "Asymptotic Error Rate Behavior for Noncoherent On-Off Keying in the Presence of Fading," *IEEE Transactions on Communications*, Vol. 47, No. 9, September 1999, pp. 1293-1296.
38. M. Zeng, A. Annamalai and V. K. Bhargava, "Recent Advances in Cellular Wireless Communications," *IEEE Communications Magazine*, Vol. 37, Sept. 1999, pp. 128-138.
39. A. Annamalai and V. K. Bhargava, "Adaptive Retransmission Diversity with Packet Combining for Slotted DS-CDMA Packet Radio Networks," *International Journal on Wireless Personal Communications*, Vol. 11, No. 3, 1999, pp. 269-291.
40. C. Tellambura and A. Annamalai, "Derivation of Craig's Formula for the Gaussian Probability Function," *Electronics Letters*, Vol. 35, August 1999, pp. 1424-1425.
41. C. Tellambura and A. Annamalai, "A Unified Numerical Approach for Computing the Outage Probability for Mobile Radio Systems," *IEEE Communications Letters*, April 1999, pp. 97-99.
42. A. Annamalai and V. K. Bhargava, "Analysis and Optimization of Adaptive Multicopy Transmission ARQ Protocols for Time-Varying Channels," *IEEE Transactions on Communications*, Vol. 46, No. 10, October 1998, pp. 1356-1368.
43. A. Annamalai, V. K. Bhargava and W. -S. Lu, "On Adaptive Go-Back-N ARQ Protocol for Variable-Error Rate Channels," *IEEE Transactions on Communications*, Vol. 46, No. 11, November 1998, pp. 1405-1408.
44. A. Annamalai, C. Tellambura and V. K. Bhargava, "Unified Analysis of MPSK and MDPSK with Diversity Reception in Different Fading Environments," *Electronics Letters*, Vol. 34, No. 16, 6th August 1998, pp. 1564-1565.

45. A. Annamalai, C. Tellambura and V. K. Bhargava, "Efficient Computation of MRC Diversity Performance in a Nakagami Fading Channel with Arbitrary Parameters," *Electronics Letters*, Vol. 34, No. 12, 11th June 1998, pp. 1189-1190.
46. A. Annamalai, "Unified Analysis of a Practical Selection Diversity System in Different Fading Environments," *Electronics Letters*, Vol. 34, 5th February 1998, pp. 243-244.
47. A. Annamalai and V. K. Bhargava, "Analysis of a Two-Stage Address Coding Scheme for FFH/MFSK Systems over Rician Fading Channels," *Electronics Letters*, Vol. 34, No. 3, 5th Feb. 1998, pp. 232-234.
48. A. Annamalai and V. K. Bhargava, "Analysis of Unslotted Direct Sequence Spread Spectrum Multiple Access Network with Packet Combining," *Electronics Letters*, Vol. 33, 25th Sept. 1997, pp. 1673-1674.
49. A. Annamalai and V. K. Bhargava, "Throughput Performance of a Slotted DS/CDMA ALOHA with Packet Combining over Generalized Fading Channels," *Electronics Letters*, Vol. 33, 3rd July 1997, pp. 1195-1197.
50. A. Annamalai, "Analysis of Selection Diversity on Nakagami Fading Channels," *Electronics Letters*, Vol. 33, No. 7, 27th March 1997, pp. 548-549.

(c) Refereed Conference Publications

1. P. Biney, R. Kommalapati, M. Gyamerah, A. Annamalai, P. Obiomon, X. Peng, M. Ketkar, N. Sarker and R. Iyengar, "Development of Performance Criteria for Assessing Program Outcomes in Engineering, Engineering Technology, and Computer Science Programs," *2008 ASEE conference*.
2. A. Annamalai, Jing Lu, D. R. Vaman, "Improving the Efficiency of Wireless Networks via a Passive Rate-Adaptation Strategy," *Proc. 2008 Wireless Telecommunications Symposium*, California, April 24-26, 2008.
3. Jing Lu, A. Annamalai, D. R. Vaman, "Reducing Signal Distortion Due to Transmission Errors via Multiresolution Digital Modulations," *Proc. 2008 Wireless Telecommunications Symposium*, California, April 24-26, 2008.
4. A. Annamalai, Jing Lu, D. R. Vaman, "A Receiver-Oriented Rate-Adaptation Strategy for Improving Network Efficiency in Mobile Ad-Hoc Networks," *Proceedings of the 2008 IEEE Sarnoff Symposium*, Princeton, NJ, April 28-30, 2008.
5. Jing Lu, A. Annamalai, D. R. Vaman, "Asymmetric PSK Constellation Design to Minimize Distortion in PCM Data Transmission," *Proceedings of the 2008 IEEE Sarnoff Symposium*, Princeton, New Jersey, April 28-30, 2008.
6. Ramesh Palat, A. Annamalai, J. H. Reed, "Log-Likelihood Ratio Based Selective Decode-and-Forward Cooperative Communication," *Proc. 2008 IEEE Vehicular Technology Conference (VTC-Spring'08)*, Singapore, May 11-14, 2008.
7. Ramesh Palat, A. Annamalai, J. H. Reed, "Precise Error Rate Analysis of Bandlimited BPSK System with Timing Errors and Cochannel Interference under Generalized Fast Fading Channels," *Proc. 2008 IEEE Vehicular Technology Conference (VTC-Spring'08)*, Singapore, May 11-14, 2008.
8. Ramesh Palat, A. Annamalai, J. H. Reed, "Efficient Computation of Information Outage Probability and Ergodic Capacity of OSTBC System," *Proc. 2008 IEEE Vehicular Technology Conference (VTC-Spring'08)*, Singapore, May 11-14, 2008.

1. C. Akujoubi, O. Odejide, A. Annamalai, and G. Fudge, "Sparseness Measures of Signals for Compressive Sampling," *Proc. 7th IEEE International Symposium on Signal Processing and Information Technology (ISSPIT'07)*, December 2007, pp. 1042-1047.
3. Kim, J.-H.; Bae, K. K.; Reed, J. H.; Annamalai, A, "Capacity and Coverage of Reverse Link DS/CDMA Cellular Systems with MIMO Implementations," *Proc. IEEE International Conference on Communications (ICC'2007)*, June 2007, pp. 5897 - 5902.
4. G. Nader and A. Annamalai, "A Methodology for the Analysis of the Coexistence Between UWB Systems and UMTS Networks," *Proc. 65th IEEE Vehicular Technology Conference (VTC'2007-Spring)*, April 2007, pp. 2920 - 2925.
5. Kim, J.-H.; Bae, K. K.; Reed, J. H.; Annamalai, A, "Transmit and Receive Diversity in the Uplink of DS/ CDMA Cellular Systems," *Proc. 65th IEEE Vehicular Technology Conference (VTC'2007-Spring)*, April 2007, pp. 1157 - 1161.
6. G. Nader and A. Annamalai, "Ultra Wideband Interference on UMTS Receivers," *Proc. International Symposium on Wireless Pervasive Computing (ISWPC '07)*, Puerto Rico, February 2007.
7. G. Nader and A. Annamalai, "A Method for the Analysis of the Impact of UWB Interference on the Performance of UMTS Networks," *Proc. International Symposium on Wireless Pervasive Computing (ISWPC '07)*, Puerto Rico, February 2007.
8. Gustavo Nader and A. Annamalai, "An Approach for the Analysis of UWB Interference on Third-Generation (3G) Wireless Networks," *Proc. IEEE Consumer Communications and Networking Conference (CCNC'2007)*, Las Vegas, January 2007, pp. 639 - 644.
9. R. C. Palat, A. Annamalai, J. H. Reed, "Efficient ABER Analysis of Bandlimited Cooperative Communication under Time Synchronization Errors," *Proc. IEEE Global Telecommunications Conference (GLOBECOM'06)*, Nov. 2006, pp. 1 - 5.
10. G. Nader, A. Annamalai and L. Ribeiro, "On the Co-existence of UWB Systems with Third Generation Wireless Networks," *Proc. 9th International Symposium on Wireless Personal Multimedia Communications (WPMC'06)*, San Diego, September 2006.
11. D. Zeng, A. Zaghoul, A. Annamalai, and E. C. Laberge "UWB Interference to Narrowband Receivers," *Proc. IEEE Consumer Communications and Networking Conference (CCNC'06)*, Las Vegas, January 2006.
12. Ramesh Palat, A. Annamalai and J. H. Reed, "Cooperative Relaying for Ad-Hoc Ground Networks using Swarm Unmanned Aerial Vehicles," *Proc. IEEE Military Communications Conference (MILCOM'05)*, Atlantic City, NJ, October 2005.
13. K. Bae, A. Annamalai and W. H. Tranter, "On the Performance Evaluation of Threshold-Based GSC(μ ,L) in Equally Correlated Nakagami Fading," *Proc. 16th Annual IEEE Personal, Indoor, and Mobile Radio Communications Conference (PIMRC'05)*, Berlin, Germany, Sept. 2005.
14. J. H. Kim, K. Bae, A. Annamalai and J. H. Reed, "The Effect of Transmit Diversity on the Erlang Capacity of Reverse Link DS/CDMA System," *Proc. 16th Annual IEEE Personal, Indoor, and Mobile Radio Communications Conference*, Berlin, Germany, Sept. 2005.

15. J. Liu and A. Annamalai, "Channel-Aware Routing Protocol for Wireless Ad-Hoc Networks: Generalized Multiple-Route Path Selection Diversity," *Proc. IEEE Vehicular Technology Conference (VTC Fall'05)*, Dallas, TX, Sept. 2005.
16. J. Gaeddert and A. Annamalai, "New Estimators for the Weibull Fading Parameters," *Proc. IEEE Vehicular Technology Conference*, Dallas, TX, Sept. 2005.
17. J. Liu and A. Annamalai, "Efficacy of Channel-and-Node Aware Routing Strategies in Wireless Ad Hoc Networks," *Proc. IEEE Vehicular Technology Conference*, Dallas, TX, Sept. 2005.
18. D. Zeng, A. Zaghoul and A. Annamalai, "Pulse Shaping Optimizer in UWB Receivers," *Proc. IEEE AP-S International Symposium on Antennas and Propagation* and USNC/URSI National Radio Science Meeting, Washington DC, July 2005, Session P42.7.
19. K. Bae, A. Annamalai and W. Tranter, "Multi-Branch Predetection Equal Gain Combiner in Equally Correlated Nakagami-m Fading Channels," *Proc. IEEE GLOBECOM'04*, Dallas, Dec. 2004, pp. 469 - 473.
20. A. Annamalai and J. Liu, "A Cross-Layer Design Perspective for Multi-Resolution Signaling," *Proc. IEEE GLOBECOM'04*, Dallas, TX, December 2004, pp. 3342 - 3346.
21. K. Bae, J.-H. Kim, A. Annamalai, W. Tranter and J. Reed, "Impact of Transmit Diversity at Handsets on the Reverse Link DS/CDMA System Capacity," *Proc. IEEE GLOBECOM'04*, Dallas, TX, December 2004, pp. 3700 - 3704.
22. K. Bae, A. Annamalai, and W. H. Tranter, "Outage Probability of Cellular Radio Networks with Partial Cancellation of Independent but Non-identically Distributed Cochannel Interferers," *Proc. IEEE Vehicular Technology Conference*, Session 10.4, Los Angeles, CA, Sept. 2004.
23. J. Liu and A. Annamalai, "Multi-Resolution Signaling for Multimedia Multicasting," *Proc. IEEE Vehicular Technology Conference*, Session 2.7, Los Angeles, CA, Sept. 2004.
24. J. Gaeddert and A. Annamalai, "Further Results on Nakagami-m Parameter Estimation," *Proc. IEEE Vehicular Technology Conference*, Session 10.3, Los Angeles, CA, Sept. 2004.
25. J. H. Kim, K. Bae, A. Annamalai, W. H. Tranter and J. H. Reed, "Reverse-Link Capacity and Interference Statistics of DS/CDMA with Transmit Diversity," *Proc. IEEE Vehicular Technology Conference*, Session 10.5, Los Angeles, CA, Sept. 2004.
26. S. Muthuswamy and A. Annamalai, "Optimized Transmit Diversity Systems in Rice Fading Channels," *Proc. IEEE Vehicular Technology Conference*, Session 2.1, Los Angeles, CA, Sept. 2004.
27. A. Aduwo and A. Annamalai, "Channel-Aware Inter-Cluster Routing Protocol for Wireless Ad-Hoc Networks Exploiting Network Diversity," *Proc. IEEE Vehicular Technology Conference*, Session 4.3, Los Angeles, CA, Sept. 2004.
28. S. Muthuswamy, I. Marsic and A. Annamalai, "New Methods of Estimating/Forecasting Link Bandwidths in 802.11b WLANs," *Proc. IEEE Vehicular Technology Conference*, Session 2.8, Los Angeles, CA, September 2004.
29. D. Zeng, A. Annamalai and A. Zaghoul, "Pulse Shaping Filter Design in UWB Systems" *Proc. IEEE Conference on Ultra Wideband Systems and Technologies*, Reston, VA, Nov. 2003, pp. 66-70.

30. S. Gaur and A. Annamalai, "Improving the Range of Ultra Wideband Transmission using Rake Receivers," *Proc. IEEE Vehicular Technology Conference*, Orlando, FL, Oct. 2003, pp. 597-601.
31. A. Annamalai, G. Deora and C. Tellambura, "Unified Analysis of Generalized Selection Diversity with Normalized Threshold Test per Branch," *Proc. 2003 IEEE Wireless Communications and Networking Conference*, New Orleans, LA, pp. 752-756.
32. G. Sarfraz and A. Annamalai, "Performance Evaluation of Cellular Mobile Radio Systems with Successive Cancellation of Non-identically Distributed Co-channel Interferers in a Rayleigh Fading Environment," *Proc. 2003 IEEE Wireless Communications and Networking Conference*, New Orleans, LA, pp. 579-584.
33. K. Vanganuru and A. Annamalai, "Analysis of Transmit Diversity Schemes: Impact of Fade Distribution, Spatial Correlation and Channel Estimation Errors," *Proc. 2003 IEEE Wireless Communications and Networking Conference*, New Orleans, LA, pp. 247-251.
34. C. Tellambura and A. Annamalai, "Unified Performance Bounds for Generalized Selection Diversity Combining in Fading Channels," *Proc. 2003 IEEE Wireless Communications and Networking Conference*, New Orleans, LA, pp. 138-143.
35. K. Vanganuru and A. Annamalai "Performance Analysis of Transmit Diversity Concepts for WCDMA in Multipath Fading Channels," *Proc. IEEE Vehicular Technology Conference (Fall'02)*, Vancouver, Canada, Sept. 2002, pp.568-572.
36. A. Annamalai, "Theoretical Diversity Improvement in GSC(N,L) and T-GSC(μ,L) over Generalized Fading Channels," *Proc. International Symposium on Wireless Communications (ISWC'02)*, Victoria, Canada, September 2002.
37. V. Dham, L. DaSilva, A. Annamalai and V. Srivastava, "A Phased Array Antenna Model for Space Division Multiple Access in Wireless Networks," *OPNETWORK'02*, Aug. 26-30, 2002, Washington DC, 7 pages on online proceedings.
38. A. Annamalai, V. Ramanathan and C. Tellambura, "Analysis of Equal-Gain Diversity Receiver in Correlated Fading Channels," *Proc. IEEE Vehicular Technology Conference*, Birmingham, AL, May 2002, pp. 2038-2041.
39. A. Annamalai, G. Deora and C. Tellambura, "Unified Error Probability Analysis for Generalized Selection Diversity in Rician Fading Channels," *Proc. IEEE Vehicular Technology Conference*, Birmingham, AL, May 2002, pp. 2042-2046.
40. A. Annamalai and C. Tellambura, "A New Approach to Performance Evaluation of Generalized Selection Diversity Receivers in Wireless Channels," *Proc. IEEE Vehicular Technology Conference*, Atlantic City, NJ, October 2001, pp. 2309-2313.
41. A. Annamalai and C. Tellambura, "An MGF-Derivative based Unified Analysis of Incoherent Diversity Reception of M-ary Orthogonal Signals over Fading channels," *Proc. IEEE Vehicular Technology Conference*, Atlantic City, NJ, October 2001, pp. 2404-2408.
42. A. Annamalai and V. Srivastava, "Outage Probability of Cellular Mobile Radio Systems Employing a Selective Co-Channel Interference Cancellation Scheme," *Proc. IEEE Vehicular Technology Conference*, Atlantic City, NJ, October 2001, pp. 492-496.
43. A. Annamalai and C. Tellambura, "The Effects of Gaussian Weighting Errors in Hybrid SC/MRC Receivers," *Proc. IEEE Wireless Communications and Networking Conference*, Chicago, IL, September 2000, pp. 211-215.

44. A. Annamalai and C. Tellambura, "Error Rates for Hybrid SC/MRC Systems on Nakagami Channels," *Proc. IEEE Wireless Communications and Networking Conference*, Chicago, Sept. 2000, pp. 227-231.
45. A. Annamalai and C. Tellambura "A General Method for Calculating Error Probabilities over Fading Channels," *Proc. IEEE International Conference on Communications (Communications Theory Mini-Conference)*, New Orleans, LA, June 2000, pp. 36-40.
46. A. Annamalai, J. Su and C. Tellambura, "Exact Analysis of Equal Gain Diversity Systems over Fading Channels," *Proc. IEEE Vehicular Technology Conference*, Tokyo, May 2000, pp. 612-616.
47. C. Tellambura, A. Annamalai and V. K. Bhargava, "Contour Integral Representation for Generalized Marcum-Q Function and Its Application to Unified Analysis of Dual Branch Selection Diversity over Correlated Nakagami Fading Channels," *Proc. IEEE Vehicular Technology Conference (Spring'00)*, Tokyo, Japan, May 2000, p. 1031-1034.
48. A. Annamalai, C. Tellambura and V. K. Bhargava, "Unified Analysis of Equal-Gain Diversity on Rician and Nakagami Fading Channels," *Proc. IEEE Wireless Communications and Networking Conference*, New Orleans, LA, September 1999, pp. 10-14.
49. A. Annamalai, C. Tellambura and V. K. Bhargava, "A Unified Approach to Performance Evaluation of Switched Diversity in Independent and Correlated Fading Channels," *Proc. IEEE Wireless Communications and Networking Conference*, New Orleans, LA, September 1999, pp. 864-868.
50. A. Annamalai and C. Tellambura, "A General Approach for Evaluating the Outage Probability in Microcellular Mobile Radio Systems," *Proc. IEEE International Conference on Communications*, Vancouver, Canada, June 1999, pp. 1836-1841.
51. A. Annamalai and C. Tellambura, "Analysis of Maximal-Ratio and Equal-Gain Diversity Systems for MQAM on Generalized Fading Channels," *Proc. IEEE International Conference on Communications*, Vancouver, Canada, June 1999, pp. 848-852.
52. Jing Su, A. Annamalai and W. -S. Lu, "Optimization of Power Allocation in a Multicell DS/CDMA System with Heterogeneous Traffic," *Proc. IEEE International Conference on Communications*, Vancouver, Canada, June 1999, pp. 1136-1140.
53. A. Annamalai, C. Tellambura and V. K. Bhargava, "Analysis of Hybrid Diversity Systems on Fading Channels," *Book of Extended Abstracts - 1999 IEEE International Symposium on Wireless Communications*, Victoria, Canada, 3-4 June 1999, pp. 70-71.
54. A. Annamalai and V. K. Bhargava, "A Reduced-Complexity Rake Receiver Structure for Indoor High-Speed Wireless Communications," *Proc. 1998 IEEE Global Telecommunications Conference*, Sydney, 8-12 Nov. 1998, pp. 253-258.
55. C. Tellambura, A. Annamalai and V. K. Bhargava, "Rapid Evaluation of SEP of M-ary QAM with Antenna Diversity in Generalized Fading Channels" *Proc. 6th IEEE International Workshop on Intelligent Signal Processing and Communication Systems*, Melbourne, Nov. 1998, pp. 635-639.
56. A. Annamalai and V. K. Bhargava, "Efficient ARQ Error Control Strategies with Adaptive Packet Length for Mobile Radio Networks," *Proc. IEEE 7th International Conference on Universal Personal Communications*, Florence, Italy, 6-8 Oct. 1998, pp. 1247-1251.

57. A. Annamalai, C. Tellambura and V. K. Bhargava, "A Simple and Accurate Analysis of Digital Communication Systems with Diversity Reception in Different Fading Environments," *Proc. 1998 International Symposium on Personal, Indoor and Mobile Radio Communications*, Boston, MA, 8-11 Sept. 1998, pp. 1055-1060.
58. A. Annamalai, C. Tellambura and V. K. Bhargava, "Error Performance of M-ary QAM with MRC Diversity Reception in a Nakagami Fading Channel," *IEEE International Symposium on Wireless Communications Digest*, Montreal, Canada, 22-24 May 1998, pp. 44.
59. A. Annamalai, V. K. Bhargava, "Mechanisms to Ensure a Reliable Packet Combining Operation in DS/ SSMA Radio Networks with Retransmission Diversity," *Proc. 48th IEEE Vehicular Technology Conference*, Ottawa, Canada, 18-21 May 1998, pp. 1448-1452.
60. A. Annamalai and V. K. Bhargava, "Analysis of Wireless Data Networks with Retransmission Diversity Combining in a Cluttered Environment," *Proc. IEEE International Conference on Personal Wireless Communications*, Bombay, India, Dec. 1997, pp. 449-454.
61. A. Annamalai and V. K. Bhargava, "Analysis of Diversity Techniques for Spread-Spectrum Radio Networks," *Nortel Advanced Technology Wireless Forum VI*, Richardson, Nov. 1997.
62. A. Annamalai, L. Freiberg, V. K. Bhargava, "Analysis and Optimization of an Adaptive Go-Back-N ARQ Protocol for Time-Varying Channels," *Proc. 1997 International Symposium on Personal, Indoor and Mobile Radio Communications*, Helsinki, Finland, Sept. 1997, pp. 447-451.
63. L. Freiberg, A. Annamalai and V. K. Bhargava, "Crest Factor Reduction Using Orthogonal Spreading Codes in Multi-Carrier CDMA Systems," *Proc. 1997 International Symposium on Personal, Indoor and Mobile Radio Communications*, Helsinki, Finland, Sept. 1997, pp. 120-124.
64. A. Annamalai, R. Wong and V. K. Bhargava, "Throughput Enhancement of a Slotted DS-CDMA ALOHA with Packet Combining," *Proc. IEEE Pacific Rim Conference on Communications, Computers and Signal Processing*, Victoria, Canada, 20-22 Aug. 1997, pp. 506-510.
65. R. Wong, A. Annamalai and V. K. Bhargava, "Evaluation of Predetection Diversity Techniques for Rake Receivers," *Proc. IEEE Pacific Rim Conference on Communications, Computers and Signal Processing*, Victoria, Canada, 20-22 Aug. 1997, pp. 227-230.
66. A. Annamalai and V. K. Bhargava, "Evaluation of a Low-Complexity Rake Receiver for the Narrowband-CDMA Indoor Wireless Channels," *Proc. International Wireless & Telecommunications Symposium*, Shah Alam, Malaysia, 14-16 May 1997, pp. 247-252.
67. A. Annamalai, "Selection Diversity Reception of Spread-Spectrum Signals with Unequal Mean Strengths," *Proc. IEEE Vehicular Technology Conference*, Phoenix, AZ, May 1997, pp. 1153-1157.
68. V. K. Bhargava and A. Annamalai, "Future Trends in Wireless Communications," *Proc. 3rd International Conference on Intelligent Applications in Communications and Power Systems*, United Arab Emirates, 6-8 April 1997, pp. 1-6.
69. A. Annamalai and V. K. Bhargava, "Performance of Selection Combining Time-Diversity ARQ in Slotted DS/CDMA Wireless Packet Radio Networks," *Proc. International Symposium on Information Theory and Its Applications*, 17-20 Sept. 1996, pp. 460-463.

70. A. Annamalai and Vijay K. Bhargava, "Some Results on FDM/DS-CDMA Signalling Scheme for Wireless Communications Networks," *Proc. IEEE International Conference on Personal Wireless Communications*, New Delhi, India, 19-21 Feb. 1996, pp. 116-122.

V. ACADEMIC ADVISING AND TRAINING

(a) Post-Graduate Training and Graduate Theses Directed

Postdoctoral Fellow Training

1. Raqibul Mostafa, Postdoctoral Research Fellow (co-supervision with Dr. J. H. Reed), 2004 (employed by Qualcomm as a Member of Technical Staff)

Ph.D. Dissertations

1. Jong-Han Kim, Ph.D. Dissertation: *Capacity and Coverage of CDMA Cellular Networks with MIMO Implementations* (co-advisor with Dr. Jeffrey H. Reed), March 2007, (employed by Samsung as a Senior Member of Technical Staff)
2. Ramesh C. Palat, Ph.D. Dissertation: *Performance Analysis of Cooperative Communications in Wireless Networks* (co-advisor with Dr. Jeffrey H. Reed), December 2006, (employed by Qualcomm as a Member of Technical Staff)
3. Kyung Bae, Ph.D. Dissertation: *Analytical Framework for Performance Analysis of Multiple Antenna Systems* (co-advisor with Dr. William Tranter), September 2005, (employed by Virginia Tech as a Postdoctoral Research Fellow)
4. Dongsong Zeng, Ph.D. Dissertation: *Pulse Shaping Filter Design and Interference Analysis in UWB Communication Systems* (co-advisor with Dr. Amir Zaghloul), July 2005 (employed by Honeywell International as a System Scientist)
5. Jin-Soo Park, Ph.D. Dissertation: *Adaptive Asymmetric Slot Allocation for Heterogeneous Traffic in WCDMA/TDD Systems* (co-advisor with Dr. Luiz DaSilva), July 2004 (employed by Korea Telecom as a Senior Member of Technical Staff)

M.S.E.E. Theses

1. Jing Lu, M.S. Thesis: *Improving the Efficiency of Wireless Networks via Multiresolution Signaling*, May 2008
2. Sarfraz Ghani, M.S. Thesis: *Selective Interference Cancellation of Dominant Interferers in WLAN*, May 2006 (employed by Qualcomm as a Member of Technical Staff)
3. Carlos Aquayo Gonzalez, M.S. Thesis: *Design and Implementation of an Efficient SCA Framework for Software Defined Radios* (co-advisor with Dr. J. H. Reed), June 2006 (continuing graduate studies in a Ph.D. program at Virginia Tech)
4. Lou Ilunga, M.S. Thesis: *Adaptive Turbo-Coded OFDM*, July 2005 (employed by the Center for Remote Sensing Institute a Member of Technical Staff)
5. Joseph Gaeddert, M.S. Thesis: *Parametric Estimation of Stochastic Fading Channels and Their Role in Adaptive Radios*, January 2005 (continuing graduate studies in a Ph.D. program at Virginia Tech)

6. Aduwo Akinyemi, M.S. Thesis: *An Opportunistic Routing Protocol Design for Wireless Networks: A Physical Layer Perspective*, April 2004 (employed by Qualcomm as a Member of Technical Staff)
7. Sudhanshu Gaur, M.S. Thesis: *Advanced Diversity Techniques for Wireless Communications*, December 2003 (continuing graduate studies in a Ph.D. program at Georgia Tech)
8. Ramanathan Viswanathan, M.S. Thesis: *Performance Evaluation of Equal Gain Diversity Systems in Correlated Fading Channels*, Dec. 2003 (employed by Texas Instruments as a Member of Technical Staff)
9. Vikash Srivastava, M.S. Thesis: *Smart Antennas and Power Management in Wireless Networks*, January 2003 (employed by Computer Networks & Software Inc. as a Member of Technical Staff)
10. Gautam Deora, M.S. Thesis: *Simulation and Mathematical Tools for Performance Analysis of Low-Complexity Receivers*, January 2003 (employed by CFRSI as a Member of Technical Staff)
11. Qiang Zhao, M.S. Thesis: *New Results on Selection Diversity over Fading Channels*, January 2003 (continuing graduate studies in a Ph.D. program at Stevens Institute of Technology)
12. Justin Smith, M.S. Thesis: *New Sharing Method Between the Fixed Satellite Service and the Aeronautical Mobile Satellite Service in the 14.0-14.5 GHz Band*, December 2002 (employed by ITT as a Senior Engineer)
13. Yu Lei, M.S. Thesis: *Resource Management with Smart Antenna in CDMA*, December 2001 (employed by Cadence as a Member of Technical Staff)

(b) Current Academic Advising Responsibilities

Ph.D. Student

1. Olusegun Odejide, Ph.D. Student (co-advisor with Dr. C. Akujoubi), Research Interests: Compression Sensing for Wideband Signal Classifications (expected completion date: December 2008)

VI. SPONSORED RESEARCH & GRANTS

Since joining the Prairie View A&M University in September 2006, I have participated in a funded research project by the U.S. Army Research Office to the Center for Battlefield Communications (CeBCom) under the Cooperative Agreement W911NF-04-2-0054. As a faculty researcher of CeBCom, I currently responsible for the sub-tasks of “designing modulation-assisted unequal error protection schemes to optimize the performance of embedded Koay-Vaman transform coding” and “investigate the efficacy of cooperative communication strategies for improved inter-cluster long-haul wireless communications” within the overall task of “design and implementation of embedded transform coding for transport of multi-service information in a noisy battlefield mobile ad-hoc networks”.

1. Co-Investigator, “Design of Efficient Communication Networks for the Development of Automatic/Aided Target Recognition Systems” (since September 2006)
 Sponsor: U.S. Army Research Office / Army Research Laboratory
 Principal Investigator: Dr. Dhadesugoor R. Vaman
 Additional Co-PIs: Dr. Siew T. Koay, Dr. Lijun Qian

Period of Performance: 2004 - 2009
Total Funding: \$2.42M

2. Co-Investigator, "Compressive Sampling Systems" (since May 2007)
Sponsor: L3 Communications
Period of Performance: 2007-2008
Total Funding: \$150,000
3. Advisor/Principal-Investigator, "Initial Mars Exploration Village" (Space Ramen Team)
Sponsor: Texas Space Grant Consortium
Period of Performance: Sept. 2007 - Dec. 2007
Total Funding: \$1,000

Prior joining the Prairie View A&M University, I had participated in 11 funded external research programs and the MPRG industrial affiliate program worth more than \$3 million to Virginia Tech. I was responsible for direct supervision of \$757,110 in funded research activities:

1. Principal Investigator, "Handset Diversity for UMTS WCDMA"
Sponsor: Magnolia Broadband Inc.
Period of Performance: July 2005 - December 2005
Total Funding: \$10,000
Personal Share of Funding: \$10,000
2. Principal Investigator, "Software GPS Radio Enabled Synthetic Space-Time Coding"
Sponsor: Office of Naval Research
Period of Performance: August 2004 - May 2005
Co-PI: Dr. Jeffrey H. Reed
Total Funding: \$65,000
Personal Share of Funding: \$48,750
3. Principal Investigator, "Handset Diversity for cdma2000: System Modeling and Simulation"
Sponsor: Magnolia Broadband Inc.
Period of Performance: December 2003 - December 2004
Total Funding: \$85,000
Personal Share of Funding: \$85,000
4. Co-Principal Investigator, "Modeling and Simulation for the FCS Development Environment"
Sponsor: Boeing/DARPA FCS
Period of Performance: July 2002 - April 2003
Principal Investigator: Dr. William H. Tranter
Additional Co-PI: R. M. Buehrer
Total Funding: \$128,022
Personal Share of Funding: \$42,674
5. Co-Principal Investigator, "Ultra-Wideband Communication System"

Sponsor: ASPIRES Program 2002/2003
Period of Performance: January 2003 - December 2004
Principal Investigator: Dr. Richard M. Buehrer
Additional Co-PIs: Dr. Dong Ha, Dr. J. Reed, Dr. W. Tranter, Dr. B. Woerner
Total Funding: \$118,360
Personal Share of Funding: \$19,727

6. Co-Principal Investigator, "Tactical Communication Architecture and the Implementation Plan for the US Customs Services"

Sponsor: US Customs
Period of Performance: September 2001 - August 2002
Principal Investigator: Dr. Luiz DaSilva
Additional Co-PIs: Dr. C. Bostian, Dr. J. Reed, Dr. B. Woerner, Dr. S. Midkiff, Dr. G. Morgan, Dr. M. Baker
Total Funding: \$402,000
Personal Share of Funding: \$50,250

7. Co-Principal Investigator, "Interference, Propagation and Antenna Placement Issues for XM Radio"

Sponsor: General Motors
Period of Performance: April 2001 - December 2002
Principal Investigator: Dr. Jeffrey H. Reed
Additional Co-PIs: Dr. W. Stutzman, Dr. W. Davis, Dr. Luiz DaSilva
Total Funding: \$583,527
Personal Share of Funding: \$116,705

8. Co-Principal Investigator, "Beamforming and Ad-Hoc Networking for Future Combat Systems"

Sponsor: Raytheon FCS
Period of Performance: March 2001 - January 2002
Principal Investigator: Dr. Luiz DaSilva
Total Funding: \$80,199
Personal Share of Funding: \$40,099

9. Principal Investigator, "Investigation into CDMA Capacity Improvements using High Performance Superconductor Filters"

Sponsor: Illinois Superconductor
Duration: July 2000 - April 2001
Co-PI: Dr. Brian D. Woerner
Total Funding: \$26,344
Personal Share of Funding: \$22,392

10. Co-Principal Investigator, "Research and Development for IMT-2000"

Sponsor: LG Information and Communications Ltd.
Period of Performance: May 2000-August 2001
Principal Investigator: Dr. William H. Tranter
Additional Co-PIs: Dr. W. Stutzman, Dr. J. Reed, Dr. B. Woerner, Dr. Luiz DaSilva

Total Funding: \$350,000
Personal Share of Funding: \$58,333

11. Co-Principal Investigator, “Intelligent Coding and Spatial Diversity for Wireless Communications”

Sponsor: Australian Research Council
Period of Performance: January 2001 - December 2002
Principal Investigator: Dr. C. Tellambura
Total Funding: \$33,300
Personal Share of Funding: \$16,650

In addition to the sponsored research funding or grants, in my role as an Associate Director of the Mobile and Portable Radio Research Group (MPRG) between January 2002 and August 2006, I have helped develop and support our Industrial Affiliate Program. Through that program, 17 companies have given \$1,232,650 in support to Virginia Tech between 2002 and 2006, and have committed another \$75,000 in support for subsequent years. As one of five core faculty with the MPRG, my personal share of this funding is \$246,530 in funding received and \$15,000 in committed funding.

VII. PROFESSIONAL ACTIVITIES AND UNIVERSITY SERVICE

Editorialship

Associate Editor, IEEE Communications Letters, 2000 - 2005
Editor, Wiley Journal on Wireless Communications and Mobile Computing, 2001 - 2005
Associate Editor, IEEE Transactions on Vehicular Technology, 2002 - 2005
Editor, IEEE Transactions on Wireless Communications (previously known as IEEE Journal on Selected Areas in Communications: Wireless Series), 2001 - 2004

Short Courses/Tutorials

1. Full-day tutorial on ‘Space-Time Processing’ (with Dr. R. M. Buehrer) was offered at the MPRG’s Annual Symposium and Wireless Summer School, June 2005 (37 participants)
2. Full-day tutorial on ‘Smart Antennas’ (with Drs. J. H. Reed, B. D. Woerner and R. M. Buehrer) was offered at the Software-Defined Radio Forum, June 2003 (65 participants)
3. Full-day and half-day tutorials entitled ‘Mathematical Modeling and Analysis of Wireless Communication Systems’ or ‘Analytical Tools for Wireless Communications Systems Design’ (with Dr. Tellambura) was offered at the following major international conferences on wireless systems and technologies:
 - IEEE Vehicular Technology Conference, May 2000, Tokyo, Japan
 - IEEE International Conference on Communications, June 2000, New Orleans, United States
 - IEEE Wireless Communications and Networking Conference, September 2000, Chicago, United States
 - IEEE Global Communications, November 2001, San Francisco, United States
 - IEEE Vehicular Technology Conference, May 2002, Birmingham, United States

These tutorials were well attended with approximately 30 registrants (engineers and researchers) each time it was offered.

Technical & Conference Organizing Committees

Technical Program Chair, 15th Annual MPRG Symposium & 1st Annual Wireless Summer School, Blacksburg, June 2005

Technical Program Committee Member: WNET'2006, WEMIC'2006, GLOBECOM'2004, ICC'2003, GLOBECOM'2003, and VTC Fall'2003

Publications Chair, 2nd IEEE Ultra-Wideband Systems and Technology (UWBST'03), Reston, 2003

Technical Program Chair, 56th IEEE Vehicular Technology Conference, Vancouver, Fall 2002

Session Organizer, IEEE International Conference on Communications (ICC'01), Helsinki, June 2001

Technology Panel Member, DARPA Tactical Targeting Network Technology, 2001

Conference Organizer, IEEE International Symposium on Wireless Communications, June 1999

Secretary, Technical Program Committee of the IEEE ICC'99, Vancouver, June 1999

Local Arrangements Committee Member, IEEE Pacific Rim Conference on Communications, Computers and Signal Processing, Victoria, August 1999

Member, Communications Theory Committee (IEEE Communications Society), 1999 - 2005

Local Arrangements Committee Member, IEEE Pacific Rim Conference on Communications, Computers and Signal Processing, August 1997

University Service

College of Engineering ABET Assessment Committee, 2007-2008

Spring 2007 Board of Examiners for the Ph.D. Preliminary Examination (Communications and Signal Processing)

Fall 2007 Board of Examiners for the Ph.D. Preliminary Examination (Computer Networks)

Center for Excellence in Undergraduate Teaching: Stochastic Study Group, 2004 - 2005

ECE Communications & Signal Processing Area Committee, 2001 - 2005

ECE Graduate Administration Committee, 2002 - 2004

Associate Director of Mobile and Portable Radio Research Group, 2002 - 2005

Patent Disclosure

Patent Application: D. Zeng, A. Annamalai, and A. Zaghoul, "Pulse shaping optimizer in UWB receiver," Honeywell invention record H0009431, submitted on December 08, 2004.

Journal, Proposal and Conference Reviewing Activities

National Science Foundation Panel Reviewer: CISE-CCF & ECS-CNCI

External Reviewer, Kentucky Science and Engineering Foundation, 2005

External Reviewer, Research Grant Council of Hong Kong, 2001-2004

External Reviewer, Natural Sciences and Engineering Research Council of Canada

External Reviewer, Alberta Ingenuity Fund, 2001/2002

DARPA Panel: Tactical Targeting Network Technology Initiative, 2001

Regular reviewer for the following transactions/journals:

IEEE Transactions on Vehicular Technology, Wiley Journal on Wireless Communications and Mobile Computing, IEEE Transactions on Wireless Communications, IEEE Communications Letters, IEEE Transactions on Communications, Electronics Letters, IEE Proceedings on Communications, International Journal on Wireless Information Networks, EURASIP Journal on Wireless Communications and Networking, and IEEE Transactions on Signal Processing

Regular reviewer for the following international conferences on wireless technology:

IEEE International Conference on Communications (ICC), IEEE Vehicular Technology Conference (VTC), IEEE Wireless Communications and Networking Conference (WCNC) and IEEE Global Communications Conference (GLOBECOM)

VIII. LIST OF UNDERGRADUATE AND GRADUATE LEVEL COURSES TAUGHT

(a) Undergraduate Level Courses

- _____ 1. ELEG 3013: Network Theory II
2. ELEG 3023: Signals and Systems
3. ECE 3614: Introduction to Communication Systems

(b) Graduate Level Courses

- _____ 1. ELEG 6303: Signal Detection and Estimation Theory
2. ELEG 6233: Coding Theory
3. ELEG 6353: Advanced Digital Signal Processing
4. ECE 5655: Communications Systems Design II
5. ECE 5656: Communications Systems Design II
6. ECE 5544: Coding Theory
7. ECE 5664: Cellular Radio and Personal Communications
8. ECE 5634: Information Theory
9. ECE 5984: Special Topics in Communications: Orthogonal Frequency Division Multiplexing
10. ECE 5654: Digital Communications

IX. LIST OF CURRENT CONTRACT OR GRANT ACTIVITIES

I joined Prairie View A&M University in September 2006 and have recently applied for research funding from several state agencies and companies. Nevertheless, I have actively participated in two funded research projects at CeBCom and CECSTR research centers during the last 18 months:

1. Project Title: Design of Efficient Communication Networks for the Development of Automatic/Aided Target Recognition Systems” (Cooperative Agreement W911NF-04-2-0054)

Funding Source: U.S. Army Research Office / Army Research Laboratory

Principal Investigator: Dr. Dhadesugoor R. Vaman

Additional Co-PIs: Dr. Siew T. Koay, Dr. Lijun Qian

Period of Performance: 2004 - 2009

Total Funding: \$2.42M

Percentage of time charged to the grant in the last year: 0%

(Graduate student researcher, Jing Lu, is fully supported from this grant.)

2. Project Title: Compressive Sensing for Classification of Wideband Communication Signals

Funding Source: L3 Communications

Principal Investigator: Dr. Cajetan Akujoubi

Period of Performance: March 2008 - December 2008

Total Funding \$50,000

Percentage of time charged to the grant in the last year: 0%
(Graduate student researcher, Olusegun Odejide, is fully supported from this grant.)

FRANKLIN D. NKANSAH, PhD.

Prairie View A&M University.

Electrical Engineering

Prairie View, TX 77446

PROFESSIONAL HIGHLIGHTS

18 years Industry experience in Silicon Technology Management, Development, Transfers,

Process Integration, Reliability and Device engineering for leading edge manufacturers in the Semiconductor Industry (AT&T Bell Laboratories, Motorola and AMD).

- Management experience, leading technology development and product transfer groups.
- Experienced in technology / product transfers to manufacturing Fabs in US, Europe, Japan, China and Taiwan.
- Experienced leader with good technology knowledge and product definition skills.
- Multi-varied experience with device integration of 1.25,0.9,0.5,0.35 and 0.13 μ m LOGIC and
- SRAM technologies including dual inlaid Copper Metallization.
- International Foundry management experience the areas of technology, product transfers, Contract negotiations and wafer/die pricing.
- Expertise in the development and integration of TFTs and Self-aligned contacts in SRAM.
- Experienced in Design and characterization of device PC's for use in manufacturing transfers.
- Experienced in development and integration of SALICIDE/POLYCIDe transistors.
- Experienced in development/integration of advanced Metallization with CMP and Low-K.
- Experience in teaching graduate-level material in Semiconductor Technology.
- **Ph.D. Degree in Electrical Engineering.**

PROFESSIONAL EXPERIENCE

Associate Professor of Electrical Engineering

2006- Present

Prairie View A&M University, Prairie View, Texas

Responsibilities:

- Developed course work for with in depth instructions in the areas of MOS Capacitors and Advanced Transistors and Process Integration of advanced manufacturing processes
- Teaching Graduate and Undergraduate courses (ELEG6413, 6523,3033,3043)
- Mentor students during the active Semesters

- Member of the EE Department's Industry Advisory Board and search committees
- Developing the departments Microelectronics Infrastructure for graduate-level research

Product Reliability Engineering Manager

2000- 2006

Advanced Micro Devices, Austin, TX

Responsibilities:

- Managing extensive product development qualifications for AMD Athlons and Hammer.
- Recruit and manage a product qualification/reliability team of 10 engineers (PhD,MS,BS), focused on Product and technology qualifications and reliability.
- Managing an in-direct team of 10 people who are in support roles (i.e. product test, FA, maskprep, yield enhancement and reliability) working together to achieve product goals.
- Managing chipset product transfers to Foundries in Taiwan.
- Interfaces with AMD customers on reliability issues and develop reliability testing to resolve product issues.
- Developing product quality systems for the microprocessor organization in preparation for the entry into the enterprise server space.
- Managed a dedicated reliability testing lab from 2000-2002 with annual budget of ~\$1M.
- Provided leadership direction for subordinates and serving as a coach to enhance their professional career development and ensure meaningful contribution to the program.
- Teaching internal AMD reliability courses with strong emphasis on Semiconductor Devices, Process Integration and Specialized Technologies such as Flash, SRAM etc. The course titled "Understanding Failure Mechanism" is offered 4 time/year and once every two years in off-shore locations in Singapore, Malaysia and Thailand.

Device Section Manager

1997- 2000

Motorola, Wireless Digital DNA Laboratories, Austin, TX

Responsibilities:

- Recruited and Managed a technology development team of 4 Ph.D. engineers and 4 technicians focused on 0.13 μ m (HiP6W) low power CMOS technology development with copper metallization for wireless DSP products in APRDL and transfer to MOS13.
- My team drove the yield of the Baseband DSP product and 1MB SRAM cache yields from 0-60% and successfully transferred and qualified the Wireless technology to MOS13 wafer fab. The technology today has generated significant revenue for SPS in Motorola.

- Also managed an in-direct team of 20 people who are in support roles (i.e. product, FA, maskprep, process engineering, yield enhancement and reliability).
- Defined the wireless technology features for the sub 1.8V low power DSP required for next generation (2.5G and 3G) Wireless CDMA,TDMA and GSM cellular phone applications in collaboration with Israel design center and Wireless Product teams.
- Managed HiP6W technology transfers to Chatered Semiconductor Ltd. in Singapore.
- Defined the technology specifications, design rules and models files for wireless products.
- Directed the design and integration of Transistors, STI, CoSi2, Nitrided gate oxide and Back-end Copper Mettalization, including Low-K materials for the HiP6W technology and products.
- Defined , designed and characterized SRAM and ROM memory bitcells, which were implemented in the GSM Baseband processor and integrated with Onyx DSP Core and ARM MCU for complete functionality.
- Provided leadership direction for subordinates and serving as a coach to enhance their professional career development and ensuring meaningful contribution to the program and the company.

Foundry Products/Technology Transfer Manager

1995- 1997

Motorola, MCTG External Fabs and Acquisitions Group, Austin, TX

Responsibilities:

- Managed a team of 5 direct reports in Austin and numerous in-direct reports at the Foundry .
- Coordinated and implemented technology/product transfers to Foundries around the world in support of Motorola SBU's in Europe, Asia and the U.S.
- Managed mask prep and sizing to ensure that a transferred product will work in a given
- Foundry's process technology by implementing careful parametric matching methodologies.
- Defined and managed the evaluation of matrix experiments to quantify product sensitivity to a Foundry process, and implement necessary tweaks to ensure robustness.
- Defined and negotiated contracts to guarantee wafer allocation and yields needed for an SBU to stay competitive in its market place .
- Initiated product shrinks to advanced small geometry technologies with acceptable yields in an effort to reduce die and wafer cost.
- Developed plans for manufacturing capital investments and provided decisive options for implementation to the MCTG manufacturing Vice President.
- Managed an operational expense budget of \$1.2M annually for Foundry Faulire Analysis lab.

- Defined inter-Fab technology transfer plans and methodology for MCTG.

Senior Staff Engineer

1993- 1995

Motorola, Advanced Products Research & Development Lab, Austin, TX

Responsibilities:

Provided leadership in advancing Motorola/Semiconductor Products Sector technology

competence in 0.35 μ m high speed BiCMOS technology:

- Developed and integrated “Quintuple Poly” module into the 0.35 μ m BiCMOS process.
- Developed Self-Aligned contacts used for Bitline and Vss contacts in the SRAM cell.
- Developed and integrated an Overgated TFT with Stacked Capacitor structure which is used as a load in the SRAM cell.
- Developed and integrated all the necessary isolation schemes required to ensure inter-poly oxide integrity.
- Pursued patents and publications to protect Motorola’s intellectual property.
- Collaborated with Photo/Etch engineering to define, optimize and implement a manufacturable DUV and I-line lithography required for 0.35 μ m technology.
- Worked with the back-end team on a series of optimizations and CMP integration into the 0.35 μ m process flow.

Member of Technical Staff

1988- 1993

AT&T Bell Laboratories, Allentown, PA.

- Teamed with manufacturing engineers to improve 0.9 μ m SALICIDE process stability and margins. This led to a more robust process with minimal scraps and a direct impact on yields.
- Project leader for the development of a manufacturing capability chip which was used in manufacturing to define manufacturable margins for the critical modules in 0.5 μ m Technology.
- Was instrumental in the successful transfer of 0.9 μ m and 0.5 μ m technologies to AT&T Orlando and Spain manufacturing facilities.
- Developed Ti/TiN diffusion barrier for Tungsten and Aluminum based metallizations for ASICs and microprocessor Technologies. This was integrated with advanced back-end planarization techniques, which led to improved step coverage.
- Worked on MOSFET device engineering using process and device simulators and split lots to meet the product requirements of 3.3V, minimum feature of 0.5 μ m with low leakage and acceptable device drive current performance.

- Designed parametrics testers for use in manufacturing to monitor the health of 0.5 μ m
- Technology. This included structures for PBL isolation, transistors, intra/inter-well isolation, stringers, contact and via structures and inter-layer isolation and oxide integrity.

EDUCATION

Ph.D., *Electrical Engineering*

Lehigh University, Bethlehem, Pennsylvania.

M.S., *Electrical Engineering*

Lehigh University, Bethlehem, Pennsylvania.

B.S., *Physics*

Kutztown University of Pennsylvania, Kutztown, Pennsylvania.

PUBLICATIONS / PATENTS / PRESENTATIONS

10 publications, 4 patents filed, 4 issued with over 20 internal and external presentations.

REFERENCES: References available upon request.

Publications

- F.D. Nkansah and M.K. Hatalis, “Modeling of Polysilicon Grain Size Effects on Fast Programming Bits in Flash EEPROMs”, *Journal of Solid State Electronics*, 2000.
- G. C-F Yeap, F. Nkansah, J. Chen, S. Jallepalli, D. Pham, A. Nangia, T. Lii, P. Le, D. Hall, D. Menke, J. Sun, A. Das, P. Gilbert, F. Huang, J. Lu, J. Benavidas, E. Banks, J. Chung, and C. Lage “A 180nm Copper/Low-k CMOS Technology with Dual Gate Oxide Optimized for Low Power and Low Cost Consumer Wireless Applications”, *IEEE VLSI Symposium*, May 2000.
- G. Yeap, F. Nkansah, J. Chen, “Plasma Induced Damage in a 0.18 μ m Low Power CMOS technology with Dual Gate Oxide and Dual inlaid Low-K Copper Interconnect”, *IEEE VLSI Symposium*, May 2000.

- F.D. Nkansah and M.K. Hatalis, “Effects of Flash EEPROM Floating Gate Morphology on Electrical Behavior of Fast Programming Bits, IEEE Trans. Electron Devices, Vol. 46, No. 7, July 1999.
- F.D. Nkansah , M.K. Hatalis and E. Prinz, “Nonerratic Behavior of Overerased Bits in Flash EEPROM”, Journal of Vaccum Science Technology B, Vol 16(6), November 1998.
- P. Gilbert, I. Yang, F. Nkansah, C. Pettinato, M. Angyal, B. Boeck, C. Fu, T. Sparks, B. Roman. “ A High Performance 1.5V 0.10um Gate Length CMOS Technology with Scaled Copper Metallization”. International Electron Devices Meeting. Technical Digest (1998)
- McNelly, T.F.; Nkansah, F , Hayden, J.D.; Perera, A.H.; Pfiester, J.R.; Subramanian, “High performance 0.25 um SRAM technology with tungsten interpoly plug” International Electron Devices Meeting. Technical Digest p.927-30 (1995)
- Perry, K.A.; Radhakrishna, Nkansah, F S.; Lage, C.;; Pol, V.; Kobayashi, T.; West, J.; Crabtree, P. “Planarization using CMP on a 16 Meg SRAM with quadruple polysilicon stacks” Proceedings of the SPIE - The International Society for Optical Engineering vol.2335 p.12-20 (1994)
- Oates, A.S ,Nkansah, F , A.S.; Martin, E.P.; Alugbin, D.:. “Comparison of Al electromigration in conventional Al alloy and W-plug contacts to silicon” Applied Physics Letters vol.62, no.25 p.3273-5 21 June (1993)
- Oates, A.S.; Nkansah, F.; Chittipeddi, S. “Electromigration-induced drift failure of via contacts in multilevel metallization “. Journal of Applied Physics vol.72, no.6 p.2227-31 15 Sept. (1992).

U.S. Semiconductor Patents

PAT. NO.

TITLE

1. 6,617,214 Integrated circuit structure and method therefore
2. 6,503,814 Method for forming trench isolation

3. 5,985,748 Method of making a semiconductor device using chemical mechanical polishing having a combination-step process
4. 5,268,332 Method of integrated circuit fabrication having planarized dielectrics
5. SR# 839663 Integrated circuit structure and method (Pending)
6. SR# 765740 Integrated circuit structure and method (Pending)

Curriculum Vitæ

James Northern, III

Assistant Professor of Electrical and
Computer Engineering

Prairie View A&M University

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Principal Fields of Interest

Modeling and Optimization of Embedded Computer Architectures

Superscalar Computer Architectures

Low Power In-Order Execution Architectures

Genetic Algorithms and Evolutionary Computation

Field-Programmable Gate Arrays (FPGA) and Image Detection Analysis

High-Performance Computing

Engineering Education

Education

Ph.D. in Electrical Engineering, Michigan State University, 2003. Department of Electrical and Computer Engineering. Research Laboratory: Genetic Algorithms Research and Applications Group. Research Supervisors: Professors Michael Shanblatt and Erik Goodman

M.S. in Electrical Engineering, University of Wisconsin, 1994. Department of Electrical and Computer Engineering. Research Supervisors: Professors Yu Hen Hu and David Wood

B.S. in Electrical Engineering, Prairie View A&M University, 1992. Department of Electrical Engineering.

Professional Experience

(2005 – Present) Assistant Professor of Electrical and Computer Engineering, Prairie View A&M University.

(2003 – 2005) Assistant Professor of Computer Sciences and Computer Engineering, Xavier University – New Orleans.

Awards and Honors

- ❖ Michigan State University Competitive Doctoral Fellowship (September 1999 – August 2003).
- ❖ GEM National Consortium for Minority Engineers Ph.D. Fellowship, Michigan State University (September 1999 – August 2000).
- ❖ University of Wisconsin Advanced Opportunities Fellowship (September 1992 – May 1994).
- ❖ GEM National Consortium for Minority Engineers Masters Fellowship, University of Wisconsin – Madison (September 1992 – May 1994).
- ❖ Prairie View A&M University President's Academic Scholarship (September 1988 – August 1992).

- ❖ Benjamin Banneker Honors College, Prairie View A&M University (September 1988 – May 1992).
- ❖ National Action Council for Minorities in Engineering Scholarship, Prairie View A&M University (September 1991 – August 1992).

Industry Experience and Consulting

Consultant, Freescale Semiconductor, Inc., Austin, TX, May-August 2004

- ❖ *IC Creation CAD Engineer*, 8/16-bit Microprocessor Division
 - Developed common physical design methodology for HC08, S08, and S12 using Cadence Encounter Platform
 - Integrated power analysis tools (Elixir, VoltageStorm, Nanosim, XTC, Fire, Thunder, and Lightning) within physical design methodology
 - Created *tcl* scripts to automate chip floorplanning process

Technical Leader, Motorola Semiconductor Products Sector, Inc., Austin, TX, July 1994 - 2000

- ❖ *Chip Integration Engineer*, Power PC Design Division
 - Team leader for chip floorplanning and integration projects
 - Tools used: IBM internal tools for timing, floorplanning, and chip integration; Cadence: Silicon Ensemble and Layout tools; DAPHNE, Design Planner, Perl, C, UNIX
- ❖ *Device Characterization and Testing*, Fast Static RAM Division
 - Developed analysis tool for SRAM bitcell characterization
 - Extracted model parameters for 0.5um and 0.35um technology design
- ❖ *Failure Analysis Engineer*, Fast Static RAM Division
 - Prepared samples for microprobing failing bits within memory array
 - Implemented and designed various tests on probe station to analyze bit failures
- ❖ *Test Engineer*, Fast Static RAM Division
 - Created test programs for characterizing FSRAM memory products
- ❖ *Product Engineer*, Fast Static RAM Division
 - Correlated tests from final test to probe to reduce design cycle time

Student Employment

- ❖ Teaching Assistant, Detroit Area Pre-College Engineering Program, Inc., Michigan State University, East Lansing, MI, June – July 2002
- ❖ Teaching Assistant, Michigan State University, Electrical and Computer Engineering, East Lansing, MI, September 2001 – May 2002
- ❖ Teaching Assistant, Engineering Pre-College Program, Prairie View A&M University, Prairie View, TX, June – August 1992

University Activities

Prairie View A&M University

- ❖ Faculty Senate (2006 to present).
- ❖ Faculty Senator-at-Large (May 2007 to present)
- ❖ Faculty Handbook Chairperson (Spring 2006 to present).
- ❖ Member, Service Learning Committee (Spring 2005 to present).
- ❖ Panther's At Work Bayou Community Cleanup (Fall 2006).
- ❖ H.T. Jones Elementary School, 1st Grade Mentorship Program (Spring 2006).
- ❖ Invited Program Moderator, Faculty and Staff Conference (2006).
- ❖ Member, Men's Leadership Council (Fall 2006).

College of Engineering

- ❖ Dwight D. Eisenhower Transportation Fellowship Program Selection Committee (2006).
- ❖ Sandia National Laboratories Campus Representative (2006).

Electrical and Computer Engineering Department:

- ❖ Computer Engineering Faculty Search Committee (Spring 2007).
- ❖ Computer Engineering Program Coordinator (2006 to present).
- ❖ Program Director, Electrical and Computer Engineering Leadership (ExCEL) Summer Camp (June 2007)
- ❖ National Society of Black Engineers Graduate and Undergraduate Recruiter for Prairie View A&M University, College of Engineering, Columbus, OH (March 2007).
- ❖ Chair, Ph.D. Qualifying Exam for Digital Systems Committee (Spring 2007).
- ❖ Pantherland Day Recruiter for Department of ECE (Spring 2007).
- ❖ College of Engineering Engineers Week Design Competition Program Coordinator (Spring 2007).
- ❖ Recruitment Presentation at Eisenhower High School, *Future Careers in Electrical and Computer Engineering*, (Spring 2007).
- ❖ Recruitment Presentation at Forrest Brook High School, *Introduction to Electrical and Computer Engineering*, (Fall 2006).
- ❖ National Society of Black Engineers Graduate and Undergraduate Recruiter for Prairie View A&M University, College of Engineering, Pittsburgh, PA (March 2006).
- ❖ Chairperson, Computer Engineering Curriculum Committee (Fall 2006).
- ❖ Member, Ph.D. Qualifying Exam for Digital Systems Committee (Sept. 2005 – Dec. 2006).
- ❖ Major's Fair Recruiter, Prairie View A&M University, Electrical and Computer Engineering (Fall 2005 and Fall 2006)

Xavier University

Computer Sciences and Computer Engineering Department:

- ❖ Coordinator for the Computer Engineering Program (2003 – 2005).
- ❖ Chairperson, Computer Engineering Curriculum Committee (2003 – 2005).

Teaching

Prairie View A&M University

In addition to 50% time in research and development, I have carried a teaching load over 62.5% per semester. The courses are numbered (roughly) by level, *e.g.*, 1xxx = freshman, 2xxx = sophomore, *etc.*

Undergraduate Courses

- ❖ “Computer Organization and Design” ELEG 4393 (Junior/Senior level design course using Xilinx Spartan3 FPGA).
 - Spring 2007. Taught using Xilinx ISE Software and implemented in VHDL.
- ❖ “Advanced Logic Design” ELEG 4353 (Senior level programming course for Xilinx Spartan3 FPGA).
 - Spring 2006. Taught using Xilinx ISE Software and implemented in VHDL.
- ❖ “Advanced Logic Design Lab” ELEG 4311 Spring 2006.
- ❖ “Computer Interface and Communications” ELEG 4253 (Junior/Senior programming course for Freescale 6812 microcontroller).
 - Fall 2006. Taught using MetroWerks CodeWarrior implemented in Assembly and C. Textbook used was J. Valvano, Introduction to Embedded Microcomputer Systems, Thomson-Brooks/Cole, Pacific Grove, CA (2003).
- ❖ “Microprocessor Systems Design” ELEG 3073 (Junior/Senior level programming course based on Introduction to Microcontrollers).
 - Spring 2007. Taught using MetroWerks CodeWarrior implemented in Assembly and C. Textbook used was F. M. Cady, Microcontrollers and Microcomputers: Principles of Software and Hardware Engineering, Oxford University Press, NY (1997) and J. Valvano, Introduction to Embedded Microcomputer Systems, Thomson-Brooks/Cole, Pacific Grove, CA (2003).
 - Fall 2006. Taught using MetroWerks CodeWarrior implemented in Assembly and C. Textbook used was F. M. Cady, Microcontrollers and Microcomputers: Principles of Software and Hardware Engineering, Oxford University Press, NY (1997).
 - Fall 2005. Taught using MetroWerks CodeWarrior implemented in Assembly and C. Textbook used was J. Valvano, Introduction to Embedded Microcomputer Systems, Thomson-Brooks/Cole, Pacific Grove, CA (2003).
- ❖ “Microprocessor Systems Design Lab” ELEG 3071 (Junior/Senior programming course based on Introduction to Microcontrollers).
 - Spring 2007. Taught using MetroWerks CodeWarrior implemented in Assembly and C. Labs contributed by Freescale Semiconductor Inc.
 - Fall 2006. Taught using MetroWerks CodeWarrior implemented in Assembly and C. Labs contributed by Freescale Semiconductor Inc.
 - Fall 2005. Taught using MetroWerks CodeWarrior implemented in Assembly and C. Textbook used was J. Valvano, Introduction to Embedded Microcomputer Systems, Thomson-Brooks/Cole, Pacific Grove, CA (2003).

Graduate Courses

- ❖ “Advanced Computer Systems Design” ELEG 6103 (Graduate level programming course for Xilinx Spartan3 FPGA).
 - Fall 2005. Taught using Xilinx ISE Software and implemented in VHDL.
- ❖ “Computer Architecture” ELEG 6113 (Graduate level programming course for DLX processor).
 - Spring 2006. Taught using Xilinx ISE Software and implemented in VHDL. Digilent Spartan 3 FPGA evaluation board was used for rapid prototyping of design.

	Fall 2005	Spring 2006	Fall 2006	Spring 2007	Fall 2007
	ELEG 3073	ELEG 4353	ELEG 3073	ELEG 3073	ELEG 4393
	ELEG 3071	ELEG 4311	ELEG 3071	ELEG 3071	ELEG 4353
	ELEG 6103	ELEG 6113	ELEG 4253	ELEG 4393	ELEG 4311
					ELEG 6103
Teaching Load	75%	75%	62.5%	62.5%	100%

Xavier University

Undergraduate Courses

- ❖ “Digital Electronics” CPEN 3220 (Junior/Senior course).
 - Spring 2004 and 2005. Design of digital gates and larger devices such as latches, flip-flops, memory, and adders using transistors. Design of larger subsystems of the computer using building blocks.
- ❖ “Electronics and Electronics Lab” CPEN 3210/3210L (Junior/Senior course using SPICE on UNIX operating system).
 - Fall 2003 and 2004. Introduction to the physical characteristics of electronic devices such as diodes and transistors. Development of circuit models of these devices. Design and analysis of circuits using these devices.
- ❖ “Hardware Systems Implementation” CPEN 4110 (Junior/Senior programming course using VHDL).
 - Spring 2004. Electronic circuit design hierarchy and the role of methodology. Application specific integrated circuits. Hardware description languages. Behavioral and structural circuit modeling. Design algorithms and design tools. Design projects. Taught using Xilinx Project Navigator and ModelSim Software and Digilent DIO 2 FPGA for rapid prototyping.
- ❖ “Logic Design and Logic Design Lab” CPEN 2110/2110L (Freshman course).
 - Fall 2003. Taught using Mano text and material.
 - Spring 2004. Taught using Mano text and material.
 - Fall 2004. Taught using Roth text and material.
 - Spring 2005. Taught using Roth text and material.
- ❖ “Introduction to Computer Engineering” CPEN 1000 (Freshman course based on Lego Robotics Programming).

- Spring 2005. Designed and developed a freshman level course titled “Introduction to Computer Engineering.” The primary focus of this course was for retention and student development.

	Fall 2003	Spring 2004	Fall 2004	Spring 2005
	CPEN 2110	CPEN 2110	CPEN 2110	CPEN 2110
	CPEN 2110L	CPEN 2110L	CPEN 2110L	CPEN 2110L
	CPEN 3210	CPEN 3220	CPEN 3210	CPEN 3220
	CPEN 3210L	CPEN 4110	CPEN 3210L	CPSC 1005
			CPEN 1000	
Teaching Load	75%	87.5%	100%	87.5%

Selected Lectures, Colloquia, and Panels

Lectures, Colloquia, and Panels

- ❖ Invited Panel, National Science Foundation CCLI proposal panel (July12-13, 2007).
- ❖ Invited Speaker, Engineering Summer Concepts Institute Program for Freshmen Students, Prairie View A&M University, Prairie View, TX (Summer 2006 & 2007).
- ❖ Invited Speaker, Minority Introduction To Engineering and Sciences Summer Program for 9th – 12th Grade students, Prairie View A&M University, Prairie View, TX (June 2006 & June 2007).
- ❖ Invited Speaker, “Modeling and Optimizing for Synthetic Aperture Radar Images Using Genetic Algorithms”, Air Force Research Laboratory, Minority Sensors Leadership Project, Panama City, FL, (March 2007).
- ❖ Invited Speaker, Michigan State University Sloan Program Graduate Recruitment Program, East Lansing, MI (March 2007).
- ❖ Invited Speaker, Sciences, Technology, Engineering, and Math Prep Summer Program for 9th – 12th Grade students, Prairie View A&M University, Prairie View, TX (June 2006).

Students Supervised

Thesis Advisor (Ph.D.)

New Program.

Advisor, M.S. of Electrical Engineering

None.

Current Ph.D. Students

Miguel Ribiero, 1st year

Current M.S. Students

Richard Tate, 2nd year

Marcus Goldston, 2nd year

Past Senior Projects Supervised

- (Spring 2007) Eric Wright, Anthony Sanders, Fuad Al Bataineh, Clayce Singletary, "Automatic Target Recognition System"
- (Spring 2007) Christopher James, Yusuff Folahan, Ann Sadiku, Sarmad Khan, "Lighting System with Zigbee Technology"
- (Fall 2006) Habibah Baffour-Awuah, Sesan Bolufemi, Jonathon Miller, Omari Traylor, "Dual-Tone Modular Frequency Project"

Current Senior Projects Supervised

- (Spring 2007) Andrew Leverette, Jarvis Cox, Julius Jackson, Terry Cossey, "Edge Detection using an FPGA-based Approach", Sponsored Project: Air Force Research Laboratories, Dayton, OH. Amount: \$20,000.
- (Spring 2007) Marcus Lockhart, LaTatiana Clabon, Christopher Lott, Miktosha James, "Automated Battery Tester Data Acquisition System", Sponsored Project: DynaTech Power Manufacturing, Ltd., Houston, TX. Amount: \$10,000.

Research Grants and Contracts

- (September 2006 – March 2008) "Recruitment and Retention for the Department of Electrical and Computer Engineering", Texas Higher Educational Coordination Board Grant, PI: James Northern, Phase I \$94,432, Phase II \$189,997.
- (September 2006 – September 2007) "Modeling and Optimizing for Synthetic Aperture Radar Image Using Genetic Algorithms", Air Force Research Lab and L.L. Clarkson, PI: James Northern, Co-PI: Paul O. Biney, \$125,000.
- (September 2006) Texas Educational Grid Project, Conoco-Phillips, High Performance Grid Networking, Electrical and Computer Engineering Department (Equipment donation) \$50,000.
- (September 2000 – May 2001) "Next Generation Computer Aided Design Tools for Chip Integration", Freescale Semiconductor, Inc., PI: Michael Shanblatt, Co-PI: James Northern, \$20,000.

List of Publications

List of Accepted/Published Peer-Reviewed Journal Publications

- ❖ James Northern, Michael Shanblatt, "Next Generation Floorplanning Tools for High Performance SoC Devices," Special Issue: International Journal of Parallel and Distributed Systems and Networks, November Vol. 4, No. 3, 2001, pp. 134-139.

List of Accepted Peer-Reviewed Conference Publications

- ❖ James Northern, John H. Fuller, John O. Attia, "Recruitment and Retention Programs For Minorities In Engineering Programs," American Society for Engineering Education Annual Conference, Honolulu, HI, June 2007.

- ❖ James Northern, John H. Fuller, "Project-Based Learning For a Digital Circuits Design Sequence at HBCUs," American Society for Engineering Education Annual Conference, Honolulu, HI, June 2007.
- ❖ James Northern, Miguel Ribiero, "GENIE: A Genetic Algorithm Model Based Integrated Simulation Framework for Design of Embedded Systems," IEEE Annual Regional Conference, Fayetteville, AR, April 2007.
- ❖ James Northern, John H. Fuller, "Project-Based Learning For a Digital Circuits Design Sequence," IEEE Annual Regional Conference, Fayetteville, AR, April 2007.
- ❖ James Northern, Michael Shanblatt, "A Multi-objective Approach to Configuring Embedded System Architectures", Lecture Notes in Computer Science, Volume 3103, Jun 2004, Pages 1326 – 1327.
- ❖ James Northern III, Michael Shanblatt, "Evaluation of Parameter Sensitivity for Portable Embedded Systems through Evolutionary Techniques", Lecture Notes in Computer Science, Volume 2724, Jan 2003, Pages 2414 - 2415.
- ❖ James Northern, Michael Shanblatt, "An Evolutionary Approach to Configuring an Embedded System Based on Power Consumption", IEEE International Workshop on System-on-a-Chip Real Time Applications, Calgary, Alberta, Canada, June 2003, Pages 201-205.

Internal Reports

Prairie View A&M University

- (2007) Developed university wide policies of Faculty Handbook for Prairie View A&M University.
- (2006) Developed Logic Circuits Labs for ELEG3021, where high-level description languages were used and rapid prototyping of design was implemented.
- (2006) Developed tutorial for VHDL using Xilinx ISE Software Package to be used in lecture, lab, or Senior Design courses.

Xavier University

- (August 2004) Designed and developed a freshman level course titled "Introduction to Computer Engineering." The primary focus of this course is for retention and student development.
- (January 2004) Developed course titled "Hardware Systems Implementation" for upper level computer engineering students. The course involved the design and implementation of microcontrollers using field-programmable gate-array logic. The design process included identifying a problem, defining specifications, developing alternative solutions, choosing a solution, and creating a model, circuit testing, and optimization. A project proposal, presentation, and report were required.

Theses

- ❖ Ph.D. Thesis, Michigan State University, December 2003, "An Evolutionary Computational Approach to Configuring Portable Embedded System Architectures".

Lijun Qian

Department of Electrical and Computer Engineering
Prairie View A&M University, Texas A&M University System
Prairie View, TX 77446

Education

1997--2001: *Ph.D.* in Dept. of Electrical & Computer Engineering
/WINLAB, Rutgers University, Piscataway, NJ.

- *Ph.D. Thesis:* "Optimal Power Control in Cellular Wireless Networks"
- *Committee:* Prof. Zoran Gajic, Prof. Roy Yates, Prof. Christopher Rose,

Prof. Narayan Mandayam, Dr. Debasis Mitra

1993--1996: *M.S.E.E.* in Dept. of Electrical Engineering, The Technion - Israel
Institute of Technology, Haifa, Israel.

1988--1993: *B.Engr.*, Tsinghua University, Beijing, P.R. China.

Professional Experience

Aug. 2003--present *Assistant Professor* in the Dept. of Electrical &
Computer Engineering at Prairie View A&M
University, Prairie View, TX.

Jan. 2001--Aug. 2003 *Research Scientist* at Networks and Systems
Research Department, Bell-Labs, Murray Hill, NJ.

Jan. 1997—Jan.2001 *Teaching and Graduate Research*
Assistant in the Department of
Electrical and Computer Engineering and
Wireless Information Network Laboratory (WINLAB),
Rutgers University.

Jan. 1994--Dec. 1996 *Research Assistant* at Robotics and Control Lab,
The Technion - Israel Institute of Technology,
Haifa, Israel.

Consultant and Internship Positions

- *Summer, 2000* *Consultant* at Bell-Labs, Murray Hill, NJ.
- *Summer, 1999* *Intern* at Bell-Labs, Murray Hill, NJ.
- *Summer, 1998* *Intern* at Corning Inc. Corning OCA East, MA.

Patents

- "Method for Scheduling Wireless Downlink Transmissions Subject to Rate Constraints", *US patent 7,298,719*, awarded Nov. 2007.

- "Uplink Scheduling for Wireless Networks", *US patent 7,158,804*, awarded Jan. 2007.
- "Method and system for closed loop power control in wireless systems", *US patent 6,944,470*, awarded Sep. 2005.

IETF Contributions

- "A Framework for Internet Network Engineering", Internet Draft, July 2001.
- "Closed-Loop Automatic Link Provisioning", Internet Draft, Feb. 2001.
- "ICMP Extension for One-way Performance Metrics", Internet Draft, July 2000.

Awards

- Senior Member of IEEE (Communications and Control Societies).
- 2008 Outstanding Teacher of the Year, College of Engineering, PVAMU.
- Central Bell-Labs Teamwork Award, June 2003.
- Electrical Engineering Graduate Fellowship, Technion, Israel, 1994-1996.
- Scholarship for Excellent Student of Tsinghua University, China, 1990-1991.

Research Interests

General areas: communications, control, and signal processing.

- Multi-Layer optimization in multihop wireless networks
 - Estimation based power control
 - QoS scheduling
 - Congestion aware routing
 - Joint power control, scheduling and routing
 - RLP/TCP interactions
- Wireless sensor networks
 - Energy efficient protocol design
 - Non-cooperative event detection
 - Sensor fusion
- Cognitive radio
 - Intelligent spectrum management
 - Joint cognitive MAC and routing
 - Game theoretic framework for cognitive wireless networks
- Wireless network security and intrusion detection
 - Secure anonymous routing
 - Analysis of various attacks and counter-measure

- Genomic signal processing
 - Genetic regulatory network modeling and inference

Funding and Grants

- \$2.42 million (Oct.2004 - Oct.2009): Center of Excellence in Digital Battlefield Communications Research (CeBCom), funded by *U.S. Army Research Office (ARO)* under Cooperative Agreement No. W911NF-04-2-0054 (together with Dr. Vaman (PI) and Dr. Koay).
- \$1 million (Sep.2005 - Sep.2008): Modeling and Testing of Advanced Mixed Signal Systems, funded by the *National Science Foundation (NSF)* under NSF HRD-0531507 (together with Dr. Attia (PI), Dr. Akujuobi, and Dr. Sadiku).

Refereed Journal Papers

13. Qian, L., H. Wang, and E. Dougherty (2008). "Inference of Noisy Nonlinear Differential Equation Models for Gene Regulatory Networks using Genetic Programming and Kalman Filtering", *IEEE Transactions on Signal Processing*, Vol.56, No.8.
14. Qian, L., D.R. Vaman, and N. Song (2007). "QoS-Aware Maximally Disjoint Routing in Power Controlled Multihop CDMA Wireless Ad Hoc Networks", *EURASIP Journal on Wireless Communications and Networking*, Volume 2007, Article ID 53717. (DOI: 10.1155/2007/53717)
15. Skataric, D., Z. Gajic, and L. Qian (2007). "Optimal Linear and Bilinear Algorithms for Power Control in 3G Wireless CDMA Networks", *European Transactions on Telecommunications*, vol.18, pp.419-426, Wiley. (DOI: 10.1002/ett.1148)
16. Qian, L., N. Song and X. Li (2007). "Detection of Wormhole Attacks in Multi-path Routed Wireless Ad Hoc Networks: A Statistical Analysis Approach", *Journal of Network and Computer Applications*, vol.30, pp.308-330, 2007.
17. Qian, L., D.R. Vaman, X. Li and Z. Gajic (2006). "Power Control and Scheduling with Minimum Rate Constraints in Clustered Multihop TD/CDMA Wireless Ad Hoc Networks", *Journal of Wireless Communications and Mobile Computing*, vol.6, pp.791-808, Wiley. (DOI: 10.1002/wcm.442)
18. Qian, L., and Z. Gajic (2006). "Variance Minimization Stochastic Power Control in CDMA Systems", *IEEE Transactions on Wireless Communications*, vol.5, no.1, pp.193-202, Jan 2006.
19. Kumaran, K., and L. Qian (2006). "Uplink Scheduling in CDMA Packet-Data Networks", *ACM Wireless Networks*, vol.12, no.1, pp.33-43, Feb 2006.
20. Qian, L., and Z. Gajic (2003). "Optimal Distributed Power Control in Cellular Wireless Systems", invited paper, *Dynamic Systems in Communication Networks*, special issue of *International Journal on Dynamics of Continuous, Discrete and Impulsive Systems*, vol.10, pp.537-559, 2003.

21. Qian, L., B. Gal-Or and E. Kreindler (1998). "Can Thrust Vectoring Save a Doomed Transport Jet?" *International Journal of Turbo & Jet-Engines*, Vol.15, No.2, 1998.

Book Chapters

1. Qian, L., J. Attia, X. Li, and D. Kataria (2008). "Energy Efficient Sensing in Wireless Sensor Networks", book chapter in *RFID and Sensor Networks*, to be published by CRC press.
2. Qian, L., J. Attia, X. Li, and D. Kataria (2008). "Power Control for Cognitive Radio Ad Hoc Networks", book chapter in *Cognitive Radio Networks*, to be published by CRC press.
3. Qian, L., N. Song, and X. Li (2007). "SARC: Secure Anonymous Routing for Cluster based MANET", Chapter 2 in *Wireless Communications Research Trends*, pp. 55-81, Nova Science Publishers.
4. Qian, L., X. Li, D. Vaman, and Z. Gajic (2006). "Joint Power Control and Proportional Fair Scheduling with Minimum Rate Constraints in Cluster Based MANET," *Lecture Notes in Computer Science*, Springer.

Refereed Conference Papers

1. Y. Chen, L. Qian, and D.R. Vaman (2008). "Hierarchical Path Metric in Multi-Hop Wireless Networks", *IEEE International Wireless Communications and Mobile Computing Conference (IWCMC)*, Crete Island, Greece.
2. S. Gao, L. Qian, and D.R. Vaman (2008). "Energy Efficient Adaptive Modulation in Wireless Cognitive Radio Ad Hoc Networks", *IEEE Workshop on Networking Technologies for Software Defined Radio (SDR) Networks*, San Francisco, CA.
3. S. Gao, L. Qian, and D.R. Vaman (2008). "Distributed Energy Efficient Spectrum Access in Wireless Cognitive Radio Sensor Networks", *IEEE WCNC*.
4. S. Gao, L. Qian, and D.R. Vaman (2008). "Energy-Efficient Resource Allocation in Cognitive Radio Ad Hoc Networks", *IEEE Sarnoff Symposium*, Princeton, NJ.
5. S. Gao, Q. Qu, L. Qian, and D.R. Vaman (2007). "Energy Efficient Adaptive Modulation in Wireless Cognitive Radio Sensor Networks", *IEEE International Conference on Communications (ICC)*, June 24-28, Glasgow, Scotland.
6. L. Qian, and H. Wang (2007). "Inference of Genetic Regulatory Networks by Evolutionary Algorithm and H_∞ Filter", (invited paper) *IEEE Statistical Signal Processing Workshop*, Aug 26-29, Madison, WI.
7. H. Wang, L. Qian, and E. Dougherty (2007). "Modeling Genetic Regulatory Networks by Sigmoidal Functions: A Joint Genetic Algorithm and Kalman Filtering Approach", *IEEE ICNC 2007*.

8. H. Wang, L. Qian, and E. Dougherty (2007). "Inference of Gene Regulatory Networks using S-System: A Unified Approach", *IEEE CIBCB 2007*.
9. L. Qian, X. Li, J. Attia, and Z. Gajic (2007). "Power Control for Cognitive Radio Ad Hoc Networks", the 15th *IEEE Workshop on Local and Metropolitan Area Networks*, June 10-13, Princeton, NJ.
10. L. Qian, X. Li, J. Attia, and Z. Gajic (2007). "Joint Power Control and Admission Control for CDMA Cognitive Radio Networks", the 15th *IEEE Workshop on Local and Metropolitan Area Networks*, June 10-13, Princeton, NJ.
11. L. Qian, N. Song, D.R. Vaman, X. Li and Z. Gajic (2006). "Joint Power Control and Maximally Disjoint Routing for Reliable Data Delivery in Multihop Wireless Ad Hoc Networks", *IEEE WCNC 2006*, Apr 2-6, Las Vegas, NV.
12. L. Qian, N. Song, D.R. Vaman, X. Li and Z. Gajic (2006). "Power Control and Proportional Fair Scheduling with Minimum Rate Constraints in Clustered Multihop TD/CDMA Wireless Ad Hoc Networks", *IEEE WCNC 2006*, Apr 2-6, Las Vegas, NV.
13. L. Qian, N. Song, and X. Li (2006). "Secure Anonymous Routing in Clustered Multihop Wireless Ad Hoc Networks", *IEEE CISS 2006*, Mar 22-24, Princeton, NJ.
14. L. Qian, A. Quamruzzaman, and J. Attia (2006). "Energy Efficient Sensing of Non-cooperative Events in Wireless Sensor Networks ", *IEEE CISS 2006*, Mar 22-24, Princeton, NJ.
15. H. Wang, L. Qian, and E. Dougherty (2006). "Inference of Gene Regulatory Networks using Genetic Programming and Kalman Filter", *IEEE Workshop on Genomic Signal Processing and Statistics (GENSIPS)*, College Station, TX, May 2006.
16. M. Lin, C. Chuang, C. Huang and L. Qian (2005). "Performance Analysis of MAC Retransmission in High-Speed Data Transmission", in Proc. of *IEEE International Conference on Wireless networks, Communications and Mobile Computing (Wirelesscom'05)*, June 2005.
17. N. Song, L. Qian and X. Li (2005). "Wormhole Attacks Detection in Wireless Ad Hoc Networks: A Statistical Analysis Approach", in Proc. of *The 1st International Workshop on Security in Systems and Networks (SSN'2005)*, Apr 2005.
18. M. Andrews, L. Qian and A. Stolyar (2005). "Optimal Utility Based Multi-User Throughput Allocation subject to Throughput Constraints", *IEEE INFOCOM 2005*, Miami, FL.
19. L. Qian, N. Song and X. Li (2005). "Detecting and Locating Wormhole Attacks in Wireless Ad Hoc Networks through Statistical Analysis of Multi-path", *IEEE WCNC 2005*, New Orleans, LA.
20. L. Qian, X. Li and Z. Gajic (2004). "Adaptive Discrete Power Control for CDMA Systems", *Proc. of Conference on Information Sciences and Systems*, pp.1044-1049, Princeton, NJ, Mar 2004.
21. K. Kumaran and L. Qian (2003). "Uplink Scheduling in CDMA Packet-Data Systems", *Proc. of IEEE INFOCOM*, Vol.1, pp.292-300, San Francisco, CA, Apr 2003.
22. K. Kumaran and L. Qian (2003). "Scheduling on Uplink of CDMA Packet-Data Network with Successive Interference Cancellation", *Proc. of IEEE WCNC*, Vol.3, pp.1645-1650, New Orleans, Mar 2003.
23. L. Qian et.al (2003). "A New Approach for Automatic Grooming of SONET Circuits to Optical Express Links", *Proc. of IEEE ICC*, Vol. 2, pp. 1407-1411, Anchorage, 2003.

24. K. Kumaran and L. Qian (2002). "Uplink Scheduling in CDMA Systems", *40th Annual Allerton Conference on Communication, Control, and Computing*, Oct. 2002.
25. L. Qian and Z. Gajic (2002). "Variance Minimization Stochastic Power Control in CDMA Systems", *IEEE ICC 2002*, NY, May 2002.
26. L. Qian and Z. Gajic (2001). "Joint Optimization of Mobile's Transmission Power and SIR Error in CDMA Systems", *American Control Conference*, Washington D.C, June, 2001.
27. L. Qian and Z. Gajic (2000). "Optimal Distributed Power Control in Cellular Wireless Systems", *38th Annual Allerton Conference on Communication, Control, and Computing*, Vol.1, pp.393-402, Urbana, IL, Oct. 2000.
28. L. Qian and Z. Gajic (2000). "Feasibility Conditions of SIR-based Power Control in TDMA Wireless Systems", *Proc. of CISS 2000*, WA2, pp.19-24, Princeton, NJ, Mar. 2000.
29. L. Qian, B. Gal-Or and E. Kreindler (1999). "Thrust Vectoring Applied to Catastrophic Failure Prevention in Jet Transports", Q-8d-01-3, pp.43-48, *Proc. of World Congress of IFAC 1999*.
30. L. Qian and C. Mavroidis (1998). "Identification of the End-Effector Positioning Errors of a High Accuracy Large Medical Robot using Neural Networks", *Innovations in Theory, Practice and Applications: IEEE/RSJ International Conf. on Intelligent Robots and Systems*, pp. 951-958, 1998.
- 31L. Qian, R. Shi, and B. Xu (1993). "Dynamic Mathematical Model and Optimal Control of Propylene Polymerization in CSTR", *Proc. Conf. on Process Control*, Beijing, China, Oct.1993. (in Chinese).

Technical Report

1. L. Qian, N. Song, and D.R. Vaman, "Joint Power Control and Maximally Disjoint Routing for Reliable Data Delivery in Multihop Wireless Ad Hoc Networks", *CeBCom Technical Report*, PVAMU, 2006.
2. L. Qian, N. Song, and D.R. Vaman, "Power Control and Proportional Fair Scheduling with Minimum Rate Constraints in Clustered Multihop TD/CDMA Wireless Ad Hoc Networks", *CeBCom Technical Report*, PVAMU, 2006.
3. K. Kumaran and L. Qian, "Uplink Scheduling in CDMA Packet-Data Systems", *NSF DIMACS Technical Report*, 2003.
4. K. Kumaran and L. Qian, "Scheduling on Uplink of CDMA Packet-Data Network with Successive Interference Cancellation", *Technical Memorandum*, Bell-Labs, Oct. 2002.

5. L. Qian et.al., "Queueing Models for User-level Performance of Proportional Fair Scheduling", *Technical Memorandum*, Bell-Labs, Oct. 2002.
6. L. Qian et. al., "Proportional Fair and Maximum Throughput Algorithms with Minimum Rate Constraints", *Technical Memorandum*, Bell-Labs, Sep. 2002.
7. K. Kumaran and L. Qian, "Uplink Scheduling in CDMA Packet-Data Systems", *Technical Memorandum*, Bell-Labs, Sep. 2002.
8. L. Qian et.al, "A New Approach for Automatic Grooming of SONET Circuits To Optical Express Links", *Technical Memorandum*, Bell-Labs, Mar. 2002.
9. L. Qian et.al., "Closed-Loop Automatic Link Provisioning", *Technical Memorandum*, Bell-Labs, June, 2001.
10. L. Qian, "Optimal Power Control in Cellular Wireless Networks". *WINLAB Technical Report, No. 228*, May, 2001
11. L. Qian, B. Gal-Or and E. Kreindler, "Thrust Vectoring Control Applied to Catastrophic Failure Prevention in Jet Transport Aircraft", EE Pub. 1186, Department of Electrical Engineering, Technion, Israel, 1998.

Work in Progress and under Review

1. S. Gao, L. Qian, and D.R. Vaman, "Distributed Energy Efficient Spectrum Access in Wireless Cognitive Radio Ad Hoc Networks", submitted to *IEEE Transactions on Wireless Communications*, 2008.
2. H. Wang and L. Qian, "Inference of gene regulatory networks using S-system: A unified approach", submitted to *Bioinformatics*, 2008.

Invited Talks

- "Inference of Noisy Nonlinear ODE Models for Gene Regulatory Networks using Genetic Programming and Kalman Filtering", Colloquium: Modeling and Analysis of Biological Networks, Center for Mathematical Biosciences, Univ. of Houston, May 2008.
- "Spatial Spectrum Sharing of Cognitive Radio Networks: A Power Control Perspective", at LSI Corporation, Allentown, PA, May 2008.
- "Achieving Robustness and Efficiency in Mission Critical Networks", Army Research Office, research triangle park, Durham, NC. Mar 2008.
- "Energy and Bandwidth Efficient Mixed Signal Embedded Networks", IAB meeting, Jan 2008.
- "Detecting and Locating Wormhole Attacks in Wireless Ad Hoc Networks: A Statistical Analysis Approach", DIMACS/DyDan workshop on information security, Texas Southern University, Dec 2007.
- "Power Control in Cognitive Radio Wireless Ad Hoc Networks", LSI Inc., Allentown, PA, Jun. 2007.
- "Achieving Robust end-to-end QoS in MANET: An Integrated Multi-layer Design", Texas A&M University, College Station, TX, Apr 2007.

- "Achieving Robust end-to-end QoS in MANET: An Integrated Multi-layer Design", Army Research Office, research triangle park, Durham, NC. Mar 2007.
- "Performance evaluation and optimization of embedded mixed signal networks", IAB meeting, Sep 2006.
- "Energy Efficient Scheduling in 3G Wireless Networks", Agere Systems Inc., Allentown, PA, Mar 2006.
- "Joint Power Control and Maximally Disjoint Routing for Multi-hop CDMA Wireless Ad Hoc Networks", Electrical Engineering Seminar Series, PVAMU, Feb 2006.
- "MPLS Traffic Engineering", Advanced Technologies, Bell-Labs, June 2001.
- "Optimal Resource Management in 3G Wireless Systems", Annual IAB Meeting - WINLAB Research Review, Oct. 2000.
- "Measurement Protocol for One-way Performance Metrics", IETF 48, Pittsburgh, Aug. 2000.
- "Optimal Distributed Fast Power Control in 3-G Wireless Systems", NEC C&C Research Lab, Princeton, NJ, Mar. 2000; Bell-Labs, Murray Hill, NJ, Apr. 2000.

Conference Presentations (since 2003)

- "Distributed Energy Efficient Spectrum Access in Wireless Cognitive Radio Sensor Networks", *IEEE WCNC*, Las Vegas, NV. March 2008.
- "Inference of Genetic Regulatory Networks by Evolutionary Algorithm and H_infinity Filter", *IEEE Statistical Signal Processing Workshop*, Madison, WI. Aug 2007.
- "Power Control in Cognitive Radio Wireless Ad Hoc Networks", the 15th *IEEE Workshop on Local and Metropolitan Area Networks*, Princeton, NJ. June 2007.
- "Joint Power Control and Admission Control for CDMA Cognitive Radio Networks", the 15th *IEEE Workshop on Local and Metropolitan Area Networks*, Princeton, NJ. June 2007.
- "Inference of Gene Regulatory Networks using Genetic Programming and Kalman Filter", *IEEE Workshop on Genomic Signal Processing and Statistics (GENSIPS)*, College Station, TX, May 2006.
- "Joint Power Control and Maximally Disjoint Routing for Reliable Data Delivery in Multihop CDMA Wireless Ad Hoc Networks", *IEEE WCNC 2006*, Las Vegas, NV.
- "Power Control and Proportional Fair Scheduling with Minimum Rate Constraints in Clustered Multihop TD/CDMA Wireless Ad Hoc Networks", *IEEE WCNC 2006*, Las Vegas, NV.
- "Energy Efficient Sensing of Non-cooperative Events in Wireless Sensor Networks", *IEEE CISS 2006*, Princeton University, NJ.
- "Secure Anonymous Routing in Clustered Multihop Wireless Ad Hoc Networks", *IEEE CISS 2006*, Princeton University, NJ.

- "Joint Power Control and Maximally Disjoint Routing for Reliable Data Delivery in Multihop CDMA Wireless Ad Hoc Networks", *ARO Technical Review*, Raleigh, NC, 2006.
- "Detecting and Locating Wormhole Attacks in Wireless Ad Hoc Networks through Statistical Analysis of Multi-path", *IEEE WCNC 2005*, New Orleans, LA.
- "Adaptive Discrete Power Control for CDMA Systems", *IEEE CISS 2004*, Princeton University, NJ.
- "Uplink Scheduling in CDMA Packet-Data Systems", *IEEE INFOCOM 2003*, San Francisco, CA.

Teaching

Teaching at PVAMU

- Spring, 2008
 - ELEG 4003: Communication Theory
 - ELEG 6203: Wireless Networks
- Fall, 2007
 - ELEG 4003: Communication Theory
 - ELEG 6213: Digital Communications
- Spring, 2007
 - ELEG 4003: Communication Theory
 - ELEG 6253: Telecommunication Network Security
- Fall, 2006
 - ELEG 4003: Communication Theory
 - ELEG 6213: Digital Communications
- Spring, 2006
 - ELEG 4003: Communication Theory
 - ELEG 6203: Wireless Networks
- Fall, 2005
 - ELEG 4003: Communication Theory
 - ELEG 6253: Telecommunication Network Security
- Spring, 2005
 - ELEG 4003: Communication Theory
 - ELEG 6233: Coding Theory
- Fall, 2004
 - ELEG 4003: Communication Theory
 - ELEG 6213: Digital Communications
- Spring, 2004
 - ELEG 2053: Introduction to Electrical Engineering

- ELEG 6253: Telecommunication Network Security
- Fall, 2003
- ELEG 6313: Stochastic Processes
- ELEG 6203: Wireless Networks

Course Modernized at PVAMU

- ELEG 4003: Communication Theory

The updated course materials provide modern treatment of communication systems at a level suitable for one-semester senior undergraduate course. Fundamentals of digital modulations and transmissions are included besides the analog counterparts.

Wireless Communications Lab

- Founder and Director
- 3 test beds: wireless sensor network test bed; VoIP test bed; WLAN test bed.
- Demonstrated to many visitors, including visitors from US Army Research Office, National Science Foundation, US Navy, Texas Coordinating Board of Higher Education (THECB), etc.

Teaching at Rutgers University

- Communication Networks
- Linear Systems and Signals
- Control Systems Design

Students Supervised

-- Alumni

1. Ning Song (***the first Ph.D. graduate from the Department of ECE at PVAMU***)
 - started spring 2004
 - Dissertation title: "Secure and Energy Efficient Routing Algorithms in Cluster Based Ad Hoc Networks".
 - Ph.D. dissertation defense on Jun. 8 2007, and Ph.D. awarded in Aug. 2007. Now he is with Brocade Communications Systems, Inc. San Jose, CA.

-- Current Doctoral Students

1. Haixin Wang (**2008 “Outstanding PhD Student” award, College of Engineering, PVAMU**)

- started spring 2005
- Dissertation title: “Inference of Gene Regulatory Networks using Advanced Signal Processing”.
- Ph.D. dissertation proposal was defended successfully in Dec 2007.

2. Song Gao

- started fall 2005
- dissertation topic: TBD.

-- Current Master Students

1. Ebal Onyiego

- started spring 2007
- Thesis topic: “Energy Efficient Mixed Signal Embedded Networks”.

2. Joseph Kamto

- started fall 2006
- Thesis topic: “Secure Anonymous Routing in Wireless Mesh Network”.
- M.S. thesis was defended successfully in May 2008.

-- Undergraduate Students (senior design projects)

1. The Design of an Intelligent Fire Sprinkler System (Sep. 2004 – May 2005)

Participating students:

- Adebowale Adejumo
- Mary-Jane Agetue
- Kwadwo Agyepong
- Alberto Bellina
- Olubusayo M. Oluwagbemi II

2. Environment Monitoring using an Ultra Low Power Distributed Wireless Sensor Network (Sep. 2005 – May 2006)

Participating students:

- David McQuiller II
 - Marques Hodge-Allen
 - Mohammad Siddiqui
 - Benjamin Richardson
3. Energy Efficient Distributed Tracking in an Ultra Low Power Wireless Sensor Network (Jan. 2006 – Jan. 2007)
- Participating students:
- Glenn Addo
 - Kierra Ball
 - Jon-Paul Dixon
 - Remlshian Perkins
4. Energy Efficient Tracking of Moving Targets using an Ultra Low Power Distributed Wireless Sensor Network (Sep. 2006 – May 2007)
- Participating students:
- Tiara Anthony
 - Rashanae Sinegaure
 - Jason Breckenridge
 - Harris Sabah
5. Wireless Border: US-Mexico Border Monitoring using a Low Power Distributed Wireless Sensor Network (Jan. 2007 – Jan. 2008)
- Participating students:
- Patrick Onwumere
 - Michaela Roberts
 - Yussuf Hussein
 - Robert Douglas
6. Accurate Target Tracking by a Low Power Distributed Wireless Sensor Network using Kalman Filtering (Sep. 2007 – May 2008)
- Participating students:
- Joel Williams
 - Christopher Love

- Donald Spencer II
- Aaron R. Griffin

Professional Activities

-- Program Committee

- Member of the Technical Program Committee, IEEE ICC 2007, 2008, 2009.
- Member of the Technical Program Committee, IEEE ISWPC 2006, 2007, 2008.
- Member of the Technical Program Committee, IEEE GlobeCom 2004, 2005, 2006, 2008.
- Member of the Technical Program Committee, IEEE GENSIPS 2008.
- Member of the Technical Program Committee, IEEE BROADNETS 2006.
- Member of the Technical Program Committee, ISMW 2006.
- Member of the Technical Program Committee, IEEE VTC F2005.

-- Session Chairs

- Session Chairs, NET 33: MANET Routing 2; NET 41: MANET cross-layer design; IEEE WCNC, New Orleans, LA, 2005.
- Judge, the 4th TAMUS Pathways Research Symposium, TX, 2006.

-- Training

- *NSF MSI* Workshop II, Feb 2008.
- *NSF Concept Inventory* Workshop, May 2007.
- *NSF MSI* Workshop I, Feb 2007.
- *NSF CAREER* Workshop, Feb 2006.
- *Discrete Model for Genetic Regulatory Networks*, Workshop at TAMU-college station, Nov.6-8, 2005.
- Short course on *Engineering Applications in Genomics*, Jan 10-12, 2005.
- *ISA EXPO 2004 and XBOW wireless sensor network training*, Oct 6, 2004.
- *OPNET* training, OPNET headquarter, Bethesda, MD. Apr 2002.

-- Others

Reviewer for numerous journals and conferences including *IEEE Transactions on Communications*, *IEEE Transactions on Wireless Communications*, *IEEE Communications Magazine*, *ACM Wireless Networks*, *IEEE Journal on Selected Areas of Communications*, *International Journal on Network Security*, *EURASIP Wireless Communications and Networking*, *IEEE INFOCOM*, *IEEE WCNC*, *IEEE ICC*, *IEEE GlobeCom*, *IEEE VTC*.

Affiliations

-- Institute of Electrical and Electronics Engineers (IEEE): Senior Member

- IEEE Control Systems Society
- IEEE Communications Society

-- Center of Excellence in Digital Battlefield Communications Research (CeBCom)

-- Founder and Director of Wireless Communications Laboratory (WiComLab)

University Activities

-- Member – PVAMU Electrical Engineering Department Scholarship Evaluation Committee 2006-2007

-- Member – PVAMU Electrical Engineering Department Graduate Handbook and Thesis Requirements Committee 2006-2007

-- Member – PVAMU College of Engineering Scholarship Evaluation Committee 2005-2006

-- Member – PVAMU Electrical Engineering Department Scholarship Evaluation Committee 2004-2005

-- Member – PVAMU Electrical Engineering Department Ph.D. Preliminary Exam Committee 2004-2007

-- PVAMU Undergraduate Student Advising in Electrical Engineering since 2004

FULL RESUME

Dr. MATTHEW N.O. SADIKU, P.E.

OBJECTIVE

To obtain a teaching and/or research position as a full professor or endowed professor.

SUMMARY OF EXPERIENCE

- Expert in data computer communications and numerical modeling of electromagnetic problems
- Significant industrial and consulting experience
- Taught several graduate-level Electrical and Computer Engineering courses
- Major professor of 15 M.Sc and Ph.D graduates
- Over 55 Presentations at conferences, seminars, radio, and TV
- Authored over 20 books and over 160 technical papers
- Outstanding Analytical and Communication skills

CURRENT RESEARCH INTERESTS

- Computer communication networks
- Numerical techniques in electromagnetics
- Engineering Education

EDUCATION

- Ph.D. in Electrical Engineering, Tennessee Technological University, 1984.
- M.Sc. in Computer Science, Florida Atlantic University, 1988.
- M.Sc. in Electrical Engineering, Tennessee Technological University, June 1982
- B.Engr. in Electrical Engineering, Ahmadu Bello University, Zaria, Nigeria, 1978

WORK EXPERIENCE

- Sept. 2002 – Present: Professor, Department of Electrical Engineering, Prairie View A&M University, Prairie View, TX
- July 2001 – Present: Senior Scientist, Boeing Satellite Systems, Los Angeles, CA
Working on broadband SMA connectors and power dividers for a Microwave Switch Matrix used in a satellite

- Aug. 2000 –June 2001: System Engineer, Lucent/Avaya Communications, Holmdel, NJ

Developed channel decomposition technique

Developed reference links and test cords

Evaluated field testers for Microtest, Fluke, and Agilent

- 1988-Aug. 2000: Professor, Department of Electrical and Computer Engineering Temple University, Philadelphia
- 1984-1988: Assistant Professor, Department of Electrical and Computer Engineering, Florida Atlantic University
- Taught several courses such as Data Communications Networks, Performance Evaluation, Stochastic Processes, Electric Circuits, Control Systems, Electromagnetics, Advanced Electromagnetics, and Partial Differential Equations
- Supervised more than 12 M.S. and Ph.D. graduate students on FDDI, Wireless networks, interconnected LAN, ATM, and modeling of electromagnetic problems.

COMPUTER SKILLS

- Platforms: Macintosh, IBM mainframe, IBM PC, VAX, and Unix Workstation
- Network Protocols: Token ring, Token bus, CSMA/CD, TCP/IP, FDDI, DQDB, ISDN, BISDN, ATM, Frame Relay, SMDS. Have taught these protocols several times. Have also performed simulation using self-developed codes in Fortran and MATLAB.
- Programming Languages: Fortran, Basic, C++, HTML
- Wordprocessors: WordPerfect, Word, and Tex
- Selected Software Packages: PSpice, MacWrite, MacDraw, Claris Works, and DrawPerfect, MATLAB, and Maple

PROFESSIONAL SERVICES/MEMBERSHIPS

Editorial Board, IEEE Potentials

Associate Editor of IEEE Transactions of Education

IEEE Region 2 Student Activities Committee Chairman

IEEE Student Faculty Advisor for Temple Branch

Reviewer for IEEE Transactions on Education

Reviewer for IEEE Transactions on Circuits and Systems

Reviewer for IEEE Transactions on Microwave Theory and Techniques

Reviewer for IEEE Antenna and Propagation

Reviewer for IEEE Microwave and Wireless Components Letters

Reviewer for International Journal for Engineering Education (IJEE)

Reviewer for Journal of Electromagnetic Waves and Applications

Reviewer for Journal of Electrostatics

Reviewer for Journal of Sound and Vibration

Reviewer for John Wiley & Sons

Reviewer for CRC Press
Reviewer for Saunders College Publishing
Instructor on "Transmission Lines" for PE Exam Refresher Courses
Judge for Pathfinders of Palm Beach and Martin Counties Scholarship
Engineering Faculty Consultant for Southeastern Consortium for Minorities in Engineering (SECME)
Chair of sessions in several conferences
Member of IEEE
Member of American Society for Engineering Education (ASEE)
Professional Engineer -- Registered in the State of Florida

AWARDS AND RECOGNITION:

- 2000 McGraw-Hill/Jacob Millman Award
- Scholarship Award by Japan Petroleum Company for being the best student in Part 2, 1977
- Scholarship award for postgraduate studies by Nigerian Federal Government, 1982.
- Dedication of FAU 1985/86 Student Handbook for outstanding service.
- Award for excellent leadership in FAU's implementation of SECME program.
- IEEE Student Branch Awards for Outstanding Teaching.
- Who's Who in American Christian Leadership, 1989.
- Who's Who in the East, 1997-1998
- Who's Who Among American Teachers & Educators, 2006-2007

LIST OF MASTER'S THESIS SUPERVISED

1. Lawrence C. Agba, "Transmission-line-matrix modeling in inhomogeneous rectangular waveguides and cavities," M.S. Thesis, Florida Atlantic University, August 1987.
2. Vincent Bommel., "Time-domain finite difference analysis of electromagnetic scattering and penetration problems", M.S. Thesis, Florida Atlantic University, Dec. 1987.
3. Susan Dervain, "Finite element analysis of inhomogeneous waveguides", M.S. Thesis, Florida Atlantic University, April 1988.
4. Raymond Jongakiem, "Electromagnetic absorption in biological bodies", M.S. Thesis, Florida Atlantic University, Aug. 1988.
5. Georgios G. Patramanis, "Performance Analysis of Metropolitan Area Subnetworks," M.S. Thesis, Temple University, January, 1993.
6. Shahruc Murad, "Performance Analysis of Interconnected LANs", M.S. Thesis, Temple University, May 1993.
7. Shobha Subramanian, "Performance Evaluation of ATM LAN," Temple University, June 1997
8. Muhammed Tofgi, "Performance Analysis of IEEE 802.11 wireless LAN," Temple University, June 1998.
9. Ashish Bhadra, "Comparative Analysis of Cell loss probability models for ATM networks," Temple University, June 1998.
10. Tan H. Nguyen, "Jitter Analysis and Simulation of Constant bit rate ATM Multiplexors," Temple University, June 2000.
11. Chukwuemeka N. Aduba, "Performance Evaluation of Video Traffic in ATM Networks," Temple University, June 2001.
12. Nana Ampah, "Analysis of ATM Networks with Self-similar Traffic," Prairie View A&M University, May 2004.
13. Elie M. Issa, "Substrate Coupling in Mixed Signal ICs," Prairie View A&M University, May 2007.

LIST OF DOCTORAL DISSERTATIONS SUPERVISED

1. Mohammad A. Kolbehdari, "Numerical Analysis of Electromagnetic Field for a Class of Composite Cylinders", Doctoral Dissertation, Temple University, January 1994.
2. Keming Gu, "Monte Carlo Solution of Potential and Waveguide Problems," Doctoral Dissertation, Temple University, May 1996.

PUBLICATIONS

A. BOOKS:

1. Sadiku, M.N.O., "Elements of Electromagnetics", New York: Holt, Rinehart and Winston, 1989.
2. Sadiku, M.N.O., "Solutions Manual for Elements of Electromagnetics", New York: Holt, Rinehart and Winston, 1989.
3. Sadiku, M.N.O., "Numerical Techniques in Electromagnetics", CRC Press, 1992.
4. Sadiku, M.N.O., "Solutions Manual for Numerical Techniques in Electromagnetics", CRC Press, 1992.
5. Sadiku, M. N. O., "Secrets of Successful Marriages," Covenant Publishers, 1991.
6. Sadiku, M. N. O., "How to Discover God's Will for Your Life," Covenant Publishers, 1991.
7. Sadiku, M.N.O., "Elements of Electromagnetics", 2nd Edition, Saunders, 1994.
8. Sadiku, M.N.O., "Solutions Manual for Elements of Electromagnetics", 2nd Edition, Saunders, 1994.
9. Sadiku, M. N. O. and M. Ilyas "Simulation of Local Area Networks," CRC Press, 1995.
10. Sadiku, M.N.O., "Metropolitan Area Networks", CRC Press, 1995.
11. M. Offoha and M.N.O. Sadiku, "Ethnic and Cultural Diversity in Nigeria", Africa World Press, 1996.

12. Charles K. Alexander and M.N.O. Sadiku, "Fundamentals of Electric Circuits", McGraw Hill, 2000.
13. C. K. Alexander and M.N.O. Sadiku, "Solutions Manual to Accompany 'Fundamentals of Electric Circuits'", McGraw Hill, 2000.
14. C. K. Alexander and M.N.O. Sadiku, "Transparency Master to Accompany 'Fundamentals of Electric Circuits'", McGraw Hill, 2000.
15. C. K. Alexander and M. N. O. Sadiku, "Problem Solving Made Almost Easy: A companion to Alexander/Sadiku's Fundamentals of Electric Circuit," McGraw Hill, 2000.
16. Sadiku, M.N.O., "Elements of Electromagnetics", New York: Oxford University Press, 3rd ed., 2001.
17. Sadiku, M.N.O., "Solutions Manual to Accompany 'Elements of Electromagnetics'", New York: Oxford University Press, 3rd ed., 2001.
18. Sadiku, M.N.O., "Numerical Techniques in Electromagnetics", CRC Press, 2nd ed., 2001.
19. Sadiku, M.N.O., "Solutions Manual to Accompany 'Numerical Techniques in Electromagnetics'", CRC Press, 2nd ed., 2001
20. Sadiku, M. N. O., "Optical and Wireless Communications: Next Generation Networks," CRC Press, 2002.
21. Sadiku, M.N.O., "Solutions Manual to Accompany 'Optical and Wireless Communications: Next Generation Networks:,'" CRC Press, 2002.
22. Charles K. Alexander and M.N.O. Sadiku, "Fundamentals of Electric Circuits", McGraw Hill, 2nd ed., 2004.
23. Nike Lawal, M. N. O. Sadiku, and P. A. Dopamu, "Understanding Yoruba Life and Culture," African World Press, 2004.
24. C. K. Alexander and M.N.O. Sadiku, "Fundamentals of Electric Circuits", McGraw Hill, 3rd ed., 2007.
25. Sadiku, M.N.O., "Elements of Electromagnetics", New York: Oxford University Press, 4th ed., 2007.
26. Sadiku, M.N.O., "Instructor's Solutions Manual for 'Elements of Electromagnetics'", New York: Oxford University Press, 4th ed., 2007.

27. C. M. Akujuobi and M. N. O. Sadiku, "Introduction to Broadband Communication Systems," SciTech Publishing, 2008.

28. C. M. Akujuobi and M. N. O. Sadiku, " Solutions Manual for 'Introduction to Broadband Communication Systems,'" CRC/SciTech Publishing, 2008.

B. CHAPTERS IN BOOKS:

1. Sadiku, M. N. O., "Analytical Modeling," a chapter in P. Fortier (ed.), Handbook of LAN Technology, CRC Press, 1992, chap. 17, pp. 387-418.
2. Sadiku, M. N. O., "Simulation Languages," a chapter in P. Fortier (ed.), Handbook of LAN Technology, CRC Press, 1992, chap. 20, pp. 467-487.
3. Sadiku, M. N. O., "Wave Propagation," Chapter 35 in R. C. Dorf (ed.), Handbook of Electrical Engineering, CRC Press, 1993, pp. 837-849.
4. Sadiku, M. N. O., "Probabilistic solution of Poisson's equation," Chapter 13 in A.H.D. Cheng & C.Y. Yang (eds.), Computational Stochastic Mechanics (CMP), 1993, 281-299.
5. Sadiku, M. N. O., "Metropolitan Area Networks," Chapter 7 in G. McClain (ed.), Handbook of Networking and Connectivity, Academic Press, 1994, pp. 215-230.
6. Sadiku, M. N. O., "Integrated Service Digital Networks," Chapter 4 in G. McClain (ed.), Handbook of Networking and Connectivity, Academic Press, 1994, pp. 123-138.
7. E. O. Adeoye and Matthew N. O. Sadiku, "The African Christian Fellowship: Strategic Links with the Diaspora and the World," in V. J. Walston and R. J. Stevens (eds.), African-American Experience in World Mission: A Call Beyond Community, William Carey Library, 2002, pp. 154-159.
8. Sadiku, M. N. O., "Wave Propagation in Free Space," in M. Golio (ed.), Modern Microwave and RF Handbook, CRC Press, 2001, pp. 9.13-9.27.
9. M. N. O. Sadiku, "Dynamic synchronous transfer mode," in M. Ilyas and H. T. Mouftah (eds.), Handbook of Optical Communication Networks, CRC Press, 2003, pp. 103-110.

10. M. N. O. Sadiku, "Multiprotocol label switching," in M. Ilyas and H. T. Mouftah (eds.), Handbook of Optical Communication Networks, CRC Press, 2003, pp. 93-102.
11. M. N. O. Sadiku, "Satellite communications," in M. Ilyas (ed.), Handbook of Ad Hoc Wireless Networks, CRC Press, 2003, pp.8.1-8.25.
12. Sadiku, M. N. O., "Wave Propagation in Free Space," in M. Golio (ed.), Microwave and RF Product Applications, CRC Press, 2003, pp. 20.1-20.16.
13. M. N. O. Sadiku, "Satellite Communication Systems," in Rajeev Bansal (ed.), Handbook of Engineering Electromagnetics, Marcel Dekker, 2004, pp. 483-506.
14. Mohammad Kolbedari and M. N. O. Sadiku, "Wave Propagation," in Rajeev Bansal (ed.), Handbook of Engineering Electromagnetics, Marcel Dekker, 2004, pp.163-183.
15. M. N. O. Sadiku and C.M. Akujuobi, "Electromagnetics," in R. Dorf (ed.), Handbook of Engineering, CRC Press, 2005, pp. 114.1-114.9.
16. M. N. O. Sadiku, "Wireless Networks," in D. Christiansen, C. K. Alexander, and R. K. Jurgan (eds.), Standard Handbook of Electronic Engineering, 5th ed., McGraw-Hill, 2005, pp. 17.81-17.102.
17. M. N. O. Sadiku, "Data Networks and Internet," in D. Christiansen, C. K. Alexander, and R. K. Jurgan (eds.), Standard Handbook of Electronic Engineering, 5th ed., McGraw-Hill, 2005, pp. 17.103 -17.124.
18. M.N. O. Sadiku and S.R. Nelatury, "Computational Electromagnetics," in R. Dorf (ed.), Electrical Engineering Handbook, CRC Press, 2006, 3rd ed., pp. 23.1 – 23.26.
19. S. M. Musa and M. N. O. Sadiku, "Local Area Networks," in R. Dorf (ed.), Electrical Engineering Handbook, CRC Press, 3rd ed., 2006, pp. 4.14-4.23.
20. M. N. O. Sadiku and C. M. Akujuobi, "Computer Networks," in R. Dorf (ed.), Electrical Engineering Handbook, 3rd ed., CRC Press, 2006, pp. 14.1-14.18.
19. Mohammad Kolbedari and M. N. O. Sadiku, "Wave Propagation," in Rajeev Bansal (ed.), Fundamentals of Engineering Electromagnetics, CRC Press, 2006, pp.163-183.

20. M. N. O. Sadiku, "Satellite Communication Systems," in Rajeev Bansal (ed.), Engineering Electromagnetics: Applications, 2006, pp. 99-119.
21. Sadiku, M. N. O. and S.R. Nelatury, "Wave Propagation in Free Space," in M. Golio (ed.), RF and Microwave Applications and Systems, CRC Press, 2nd ed., 2008, pp. 29.1-19.20.

C. NON-EDUCATIONAL JOURNAL PAPERS:

1. Sadiku, M.N.O., "Refractive Index of Snow at Microwave Frequencies", Appl. Opt., Vol. 24, No. 24, pp. 572-575, Feb. 1985.
2. Sadiku, M.N.O. and L.C. Agba, "A Simple Introduction to the Transmission-Line Modeling", IEEE Circuits and Systems, vol. CAS-37, no. 8, 1990, pp. 991-999.
3. Sadiku, M.N.O. and M. Ilyas, "Performance Analysis of Token-Passing Local Area Networks", Journal of Engineering Research, vol. 2, no. 1, April 1990, pp. 27-44.
4. Sadiku, M. N. O. and C. O. Obiozor, "Annotated Bibliography of Numerical Modeling in EMC," International Journal of Numerical Modelling, vol. 4, 1991, pp. 259-269.
5. Sadiku, M. N. O. and D. Hunt, "Solution of Dirichlet problems by the Exodus Method," IEEE Transactions of Microwave Theory & Techniques, vol. 40, no. 1, Jan. 1992, pp. 89-95.
6. Sadiku, M.N.O., "Monte Carlo Solution of axisymmetric Potential Problems", IEEE Trans. Industrial Application, Vol. 29, No. 6, Nov/Dec. 1993, pp. 1042-1046.
7. Sadiku, M.N.O., "Nigeria in the Global Technological Race", CONPO Review, Vol. 2, No. 1, March 1993, pp. 26-31.
8. Sadiku, M.N.O. and A.S. Arvind, "Annotated Bibliography on Distributed Queue Dual Bus (DQDB)", Computer Comm. Review, Vol. 24, No. 1, January 1994.
9. M. N. O. Sadiku, S. O. Ajose, and F. Zhibao, "Applying the Exodus Method to solve Poisson's Equation," IEEE Trans. Micro. Theo. & Tech., V. 42, No. 4, April 1994, pp. 661-666.
10. S. O. Ajose, M. N. O. Sadiku, and U. Goni, "Computation of Attenuation, phase rotation, and cross-polarization of radio waves due to rainfall in

tropical regions," IEEE Trans. on Ant. & Prop., Vol. 43, No. 1, January 1995, pp. 1-5.

11. K. Gu and M.N.O. Sadiku, "A Triangular Mesh Random Walk for Dirichlet Problems", Journal of the Franklin Institute, Vol. 332B, no. 3, pp.569-578, 1996.
12. M.A. Kolbehdari and M.N.O. Sadiku, "Finite Element of an Array of Cylindrical Rods or Rectangular bars Between Ground Planes", Journal of the Franklin Institute, vol. 335B, no. 1, Jan. 1998, pp. 97-107.
13. R.C. Garcia and M.N.O. Sadiku, "Neuro-Monte Carlo Solution of Electrostatic Problems", Journal of the Franklin Institute, vol. 335B, no. 1, Jan. 1998, pp. 53-69.
14. Sadiku, M.N.O. and R. C. Garcia, "Whole field computation using Monte Carlo method," Inter. Journal of Numerical Modeling, vol. 10, 1997, pp. 303-312.
15. J. Chen, K. Zhang, M. Sadiku, and A. Tseng, "Electromagnetic enhancement of melt spinning and strip casting," Jour. of Materials, Jan. 1998.
16. S. R. Nelatury, T.L.Hemminger, and M.N.O. Sadiku, "An experimental model of a plasma core inductor," IEEE Trans. on Plasma Science, vol. 33, no. 3, June 2005, pp.1100-1105..
17. M. N. O. Sadiku, C. M. Akujuobi, and R. C. Garcia, "An introduction to wavelets in electromagnetics," IEEE Microwave Magazine, vol. 6, no.2, June 2005, pp. 63-72.
18. C. M. Akujuobi, J. Shen, and M. N. O. Sadiku, "A new parallel greedy bit-loading algorithm with fairness for multiple users in a DMT system," IEEE Transactions on Communications, vol. 54, no. 8, Aug. 2006, pp. 1374-1380.
19. S. M. Musa, M. N. O. Sadiku, and C. M. Akujuobi, "S-Parameters for three and four two-port networks," Technology Interface, vol. 7, no. 2, Spring 2007.
20. C. M. Akujuobi, N. K. Ampah, and M. N. O. Sadiku, "An intrusion detection technique based on change in Hurst parameter with application to network security," International Journal of Computer Science & Network Security, vol. 7, no. 5, May 2007, pp. 55-64.

- 21 M. N. O. Sadiku, C.M. Akujuobi, S.M. Musa, and S. R. Nelatury, "Analysis of time-dependent cylindrical problems using Monte Carlo," *Microwave and Optical Technology Letters*, vol. 49, no. 10, Oct. 2007, pp. 2571-2573.
- 22 M. N. O. Sadiku, C.M. Akujuobi, S.M. Musa, and S. R. Nelatury, "Direct Monte Carlo simulation of time-dependent problems," *Technology Interface*, Fall 2007.
- 23 S. M. Musa and M. N. O. Sadiku, "Modeling and simulation of shielded microstrip lines," *Technology Interface*, Fall 2007.
- 24 S. M. Musa and M. N. O. Sadiku, "Using finite element method to calculate capacitance, inductance, characteristic impedance of open microstrip lines," *Microwave and Optical Technology Letters*, vol. 50, no. 3, March 2008, pp. 611-614.
- 25 S. M. Musa and M. N. O. Sadiku, "Calculating the Capacitance and Inductance of Multiconductor Transmission Lines," *Technology Interface*, Spring 2008.

D. EDUCATIONAL JOURNAL PAPERS:

1. Sadiku, M.N.O., "Problems Faced By Undergraduate Students Studying Electromagnetics", *IEEE Trans. Educ.*, Vol. E-29, No. 1, pp. 31,32, Feb. 1986.
2. Sadiku, M.N.O., Book Review on "Engineering Electromagnetics" by, W.H., Hayt, *IEEE Trans. Educ.*, Vol. E-29, No. 4, pp. 208,209, Dec. 1986.
3. Sadiku, M.N.O., "Convolution Using Singularity Functions", *IEEE Trans. Educ.*, Vol. E-30, No. 1, pp. 52-54, Feb. 1987.
4. Sadiku, M.N.O. and Falade, C.I., "Using Objective Tests in Engineering", *Int. J. Appl. Engr. Educ.*, Vol. 3, No. 5, pp. 583-589, 1987.
5. Sadiku, M.N.O. and C.Y. Sadiku, "Conducting Effectively Research", *IEEE Potentials*, pp. 41-44, Feb. 1988.
6. Sadiku, M.N.O. and C.Y. Sadiku, "Writing a Research Report", *IEEE Potentials*, pp. 41-44, May 1988.
7. Sadiku, M.N.O., "Computer Plotting of Electric Field Lines and Equipotentials", *Int. J. Appl. Engr. Educ.*, Vol. 4, No. 5, 1988, pp. 395-398.

8. Sadiku, M.N.O., "Artificial Intelligence", IEEE Potentials, May 1989, pp. 35-39.
9. Sadiku, M.N.O., "A Simple Introduction to Finite Element Analysis of Electromagnetic Problems", IEEE Trans. Educ., Vol. 32, no. 2, May 1989, pp. 85-93.
10. Sadiku, M.N.O., "A Proposed Course on Numerical Techniques in EM", IEEE Trans. Educ., vol. 33, no. 1, Feb. 1990, pp. 47-50.
11. Sadiku, M.N.O., "Monte Carlo Methods in an Introductory EM Course", IEEE Trans. Educ., vol. 33, no. 1, Feb. 1990, pp. 73-80.
12. Sadiku, M.N.O., "Finite Difference Solution of Axisymmetric Potential Problems" International Journal of Applied Engineering Education, vol. 6, no. 4, 1990, pp. 479-486.
13. Sadiku, M.N.O., "Finite Difference Solution of Electrodynamics Problems", International Journal of Electrical Engineering Education, vol. 28, no. 3, July 1991, pp. 230-245.
14. Sadiku, M.N.O., "Microwave Engineering: A Brief Review", IEEE Potentials, Feb. 1991, pp. 16-17.
15. Sadiku, M.N.O. et. al., "Further Introduction to Finite Element Analysis of Electromagnetic Problems", IEEE Trans. Education, vol. 34, no. 4, Nov. 1991, pp. 322-329.
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17. Sadiku, M. N. O., "Electromagnetic Compatibility," IEEE Potentials, April 1992, pp. 16-18.
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21. Sadiku, M. N. O. and M. R. Tofighi, "A Tutorial on Simulation of Queueing

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 23. Sadiku, M. N. O., “Inventing,” *IEEE Potentials*, vol. 16, no. 4, Oct/Nov. 1997, pp. 23-24.
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 33. C. M. Akujuobi and M. N. O. Sadiku, “The present and future of broadband communications,” *IEEE Potentials*, vol. 24, no. 4, Oct./Nov. 2005, pp. 12-16.
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36. M. N. O. Sadiku and P. Obiomon, "Diversity in the workplace," IEEE Potentials, vol. 26, no. 5, Sept./Oct. 2007, pp. 5-6.

E. CONFERENCE PAPERS:

1. Sadiku, M.N.O. and L.C. Agba, "New Permutation Rules for Generating Finite Element Fundamental Matrices", Proc. of SOUTHEASTCON, 1989, pp. 797-801.
2. Sadiku, M.N.O. et. al., "Stability Criteria for Finite Difference Time-Domain Algorithm", IEEE Southeastcon, April 1990, pp. 48-50.
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5. Sadiku, M.N.O., "Monte Carlo Solution of axisymmetric Potential Problems", Conference Records of IEEE Industrial Application Society Annual Meeting, October 1990, pp. 1894-1900.
6. Sadiku, M. and C. Sadiku, "Nigerian Cultures: Their Damaging Effects", CONPO University of Pennsylvania, 1990. Also appeared in Nigerian News Digest, vol. 4, no. 4, Feb. 1992, p. 14; vol. 3, no. 5, Feb. 1992, pp. 14,16; vol. 3, no. 6, March 1992, pp. 14,16; vol. 3, no. 7, March 1992, pp. 14,16.
7. Sendaula, M., M. Sadiku, and R. Heiman, "Crosstalk Computation in Coupled Transmission Lines", IEEE Southeastcon, April 1991, pp. 790-795.
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F. PAPERS SUBMITTED FOR PUBLICATION:

1. K. Gu, M. N. O. Sadiku, and R. C. Garcia, "Absorbing Markov chain solution of Poisson's equation," Inter. J. of Numerical Modeling
2. M. N. O. Sadiku and R. Garcia, "A Simple Introduction to Wavelets" IEEE Transactions on Education.
3. M. N. O. Sadiku, Book Review on "Microstrip Filters for RF/Microwave Applications," by J. S. Hong and M. J. Lancaster., submitted to IEEE Microwave Magazine.
4. C.M. Akujuobi, M. Sadiku, and L. Hu, "Effective number of bits testing of mixed-signal systems using discrete wavelet transform," submitted to IEEE Trans. Instrumentation and Measurement.
5. C.M. Akujuobi, J. Lian, M. Sadiku, and L. Hu, "Test-point selection method for mixed signal systems using discrete wavelet transform," submitted to Digital Signal Processing.
6. M. N. O. Sadiku and K. Gu, "Floating random walk algorithm for solving axisymmetric problems," Inter. J. of Numerical Modeling
7. S. M. Musa, C. M. Akujuobi, and M. N. O. Sadiku, "On the Evaluation of Listening Quality VoDSL Solutions for Simultaneous Multiple Voice with Data Connections on High-Speed Digital Lines," submitted
8. S. M. Musa and M. N.O. Sadiku, "Test performance of integrated digital loop carrier I network convergence technology," submitted to International Conference on Wireless Technology,

FUNDED RESEARCH

1. R.A. Messenger and M.N.O. Sadiku, " Underwater electrical equipment safety study", Aqua-vac System Inc., January 1985. (\$2,000)
2. V. Ungvichian, Y. Kim, and M.N.O. Sadiku, "Radiation modeling of Personal Computer: Series II", IBM, April 1985. (\$32,000)
3. V. Ungvichian, Y. Kim, and M.N.O. Sadiku, "Radiation modeling of Personal Computer: Series III", IBM, October 1985. (\$25,000)
4. M.N.O. Sadiku and V. Ungvichian, "A Mathematical Model and Design of an RF Sticker Tag", Sensormatic Electronics Corporation, November 1985. (\$6,887)
5. M.N.O. Sadiku and H. Helmkin, "Propagation modeling for the Jammer Location Program", M.I.T./Lincoln Lab., August 1987. (\$39,673)
6. M.N.O. Sadiku and L.C. Agba, "Fundamental Matrices for Finite Element Analysis", Dept. of Elect. & Comp. Engr., F.A.U., Dec. 1987. (\$4,500)
7. John Attia, Cajetan Akujuobi, Lijun Qian, and Matthew Sadiku, "Modeling and testing of advanced mixed signal systems," National Science Foundation, Sept. 1, 2005 to Aug. 31, 2008 (\$1,000,000)

SHORT BIOGRAPH

Matthew N. O. Sadiku was born at Shagamu, Nigeria on May 17, 1955. He received his B. Sc. degree in 1978 from Ahmadu Bello University, Zaria, Nigeria and his M.Sc. and Ph.D. degrees from Tennessee Technological University, Cookeville, TN in 1982 and 1984 respectively. From 1984 to 1988, he was an assistant professor at Florida Atlantic University, where he did graduate work in computer science. From 1988 to 2000, he was at Temple University, Philadelphia, PA, where he became a full professor. From 2000 to 2002, he was with Lucent/Avaya, Holmdel, NJ as a system engineer and with Boeing Satellite Systems as a senior scientist. He is presently a professor at Prairie View A&M University.

He is the author of over 160 professional papers and over 20 books including "Elements of Electromagnetics" (Oxford, 4th ed., 2007), "Fundamentals of Electric Circuits" (McGraw-Hill, 3rd ed., 2007, with C. Alexander), "Numerical

Techniques in Electromagnetics” (CRC, 2nd ed., 2001), and “Metropolitan Area Networks” (CRC Press, 1995). Some of his books have been translated into Korean, Chinese (and Chinese Long Form in Taiwan), Italian, Portuguese, and Spanish. He was the recipient of the 2000 McGraw-Hill/Jacob Millman Award for outstanding contributions in the field of electrical engineering.

His current research interests are in the areas of numerical modeling of electromagnetic systems and computer communication networks. He is a registered professional engineer and a senior member of the Institute of Electrical and Electronics Engineers (IEEE). He was the IEEE Region 2 Student Activities Committee Chairman. He was an associate editor for IEEE Transactions on Education.

ADDITIONAL INFORMATION

US citizen, Open to relocation

Brief Vitae of Dhadesugoor R. Vaman
Texas Instrument Endowed Chair Professor of
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A. Professional Preparation:

The City University of New York, New York Electrical Engg., Ph.D. 1979
The City College of New York, New York Electrical Engg., M.E. 1975
Regional Engineering College, Warangal, India Electronic Instrumentation, M.Tech. 1972
Regional Engineering College, Warangal, India Electrical Engg., B.E. 1970

B. Appointments:

2002 – Present Texas Instrument Endowed Chair Professor, EE Department, Prairie View A&M University, Prairie View, Texas.
1998 – 2002 Chairman and CEO of Megaxess Corporation (restructured as MXC Inc.), Bethesda, Maryland.
1984 – 1998 Professor of EECS and Founding Director of Advanced Telecommunications Institute, a US Navy Center of Excellence in Telecommunications, Stevens Institute of Technology, Hoboken, NJ.
1981 – 1984 Member, Technical Staff; COMSAT Laboratories, Clarksburg, MD.
1979 – 1981 Member, Technical Staff; Network Analysis Corporation (CONTEL), Vienna, VA.
1979 – 1983 Adjunct Professor in EECS, George Washington University, Washington DC.
1974 – 1979 Research Associate, Communications Laboratory, the City College of New York, NY.
1972 – 1974 Systems Engineer, The Space Applications Center, Indian Space Research Organization, Ahmedabad, India.
1985 – 1989: Faculty Advisor Advanced Communications Division, National Institute of Standards and Technology.
1984 – 1998: Strategic Consultant for GTE, Marconi, ITT, Inter-Digital, AT&T, DGM&S, Transwitch and other corporations.

C. Patents and Publications: (Published over 200 journal and conference papers. In addition, I have written over 26 patents including 11 issued).

Recent Publications:

6. “A Simple and Least Complex KV Transform Coding Technique with Low BER Performance at Low Eb/No for Multi-Tiered Applications in Power and Bandwidth Constrained MANET/Sensor Networks”, *IEEE GLOBECOM 2008*, New Orleans (**Submitted**).
7. “Distributed Energy Efficient Spectrum Access in Cognitive Radio Wireless Ad Hoc Networks”, *IEEE Transactions on Networking*, (**Submitted**).
8. “A Receiver-Oriented Rate-Adaptation Strategy for Improving Network Efficiency in Mobile Ad-Hoc Networks”, Proceedings of *IEEE Sarnoff Symposium*, April 27 – May 3, 2008, Princeton, NJ.

9. "Asymmetric PSK Constellation Design to Minimize Distortion in PCM Data Transmission", Proceedings of *IEEE Sarnoff Symposium*, April 27 – May 3, 2008, Princeton, NJ.
10. "Cognitive Radio Mixed Sensor and Mobile Ad Hoc Networks (SMANET) for Dual Use Applications", *IEEE International Conference on Systems, Man and Cybernetics (IEEE SMC 2008) Conference*, Singapore, October 12-15, 2008 **(Invited Paper)**.
11. "Cooperative Virtual MIMO Transmissions in Wireless Networks with System Constraints", *Invited Paper at the IEEE International Conference on Systems, Man and Cybernetics (IEEE SMC 2008) Conference*, Singapore, October 12-15, 2008 **(Invited Paper)**.
12. "Improving the Efficiency of Wireless Networks via a Passive Rate-Adaptation Strategy", *Proceedings of the IEEE 7th Annual Wireless Telecommunications Symposium (WTS 2008)*, Pomona, California, April 24-26, 2008.
13. "Reducing Signal Distortion due to Transmission Error via Multi-resolution Digital Modulations", *Proceedings of the IEEE 7th Annual Wireless Telecommunications Symposium (WTS 2008)*, Pomona, California, April 24-26, 2008.
14. "Work Complexity and Information Technology", **Key Note Speech, The Eighth Annual Symposium on Human Interaction with Complex Systems (HICS 2008) – Second Topical Workshop on Sense Making**, Norfolk, Virginia, April 3-4, 2008.
15. "Cognitive Radio Mixed Sensor and MANET", *Invited Paper at the Joint Finnish DOD and US DOD Conference*, Washington D.C., March 11 – 12, 2008.
16. "Cross – Layer Distributed Power Control and Scheduling for Delay – Constrained Applications over CDMA – based Wireless Ad Hoc Networks", *IEEE Transactions on Communications*, **Accepted for Publications (To appear in IIQ 2008)**.
17. Distributed Energy Efficient Spectrum Access in Wireless Cognitive Radio Sensor Networks", *IEEE Wireless Communications Network Conference (WCNC)*, Los Vegas, **March 31 - April 3, 2008**.
18. "Cognitive Radio Based Multi-User Resource Allocation in Mobile Ad Hoc Networks using Multi-Carrier CDMA Modulation", *IEEE Journal of Selected Area Communications (IEEE JSAC) Special Issue on Cognitive Radios*, **Vol. 26, No. 1, January 2008, pp 70 – 82**.
19. "Energy Efficient Adaptive Modulation in Wireless Cognitive Radio Sensor Networks", *Proceedings of IEEE International Communications Conference (ICC'2007)*, Glasgow, United Kingdom, **Session WAS21, Paper no. 4, June 25 – 27, 2007**.
20. "Distributed Spectrum and Power Control in Cognitive Radio based Wireless Ad Hoc Networks", *Proceedings of the IEEE Sarnoff Symposium*, **April 30 – May 2, 2007, Princeton, NJ, Published**.
21. "QoS Aware Maximally Disjoint Routing in Power Controlled Multi-hop CDMA wireless Ad Hoc Networks Extended Results", *EURASIP Journal of Wireless Communications Networks (JWCN) (Special Issue)*, **October 2006**.

22. "Joint Power Control and Proportional Fair Scheduling with Minimum Rate Constraint in Cluster based MANET", *Proceedings of the 2nd International Conference on Mobile Ad-hoc and Sensor Networks (MSN-2006)*, Hong Kong Polytechnic University, Hong Kong, December 13-15, 2006.
23. "Power Control and Scheduling with Minimum Rate Constraints in Clustered TD/CDMA Wireless Ad Hoc Networks", *John Wiley Journal on Wireless Communications and Mobile Computing*, fall 2006, pp 791-808.
24. "Distributed Power and Scheduling Management for Mobile Ad Hoc Networks with Delay Constraints", *Proceedings of the IEEE MILCOM – 2006*, October 23 – 27, 2006, Washington DC.
25. "Management and Control of Highly Mobile Ad hoc Wireless Network for supporting Multi-Service QoS assured Applications" *Invited Paper at the Wireless Conference in University of Helsinki, Finland, May 22, 2006.*
26. "Joint Power Control and Maximally Disjoint Routing for Reliable Data Delivery in Multi-hop CDMA Wireless Ad Hoc Networks", *Proceedings of IEEE Wireless Communications Networks Conference (WCNC), NET 14-2, Ad Hoc Network Routing, Las Vegas, April 3-6, 2006.*
27. "Power Control and Proportional Fair Scheduling with Minimum Rate Constraints in Clustered Multi-hop TD/CDMA Wireless Ad Hoc Networks", *Proceedings of IEEE Wireless Communications and Networking Conference, April 3-6, 2006, Las Vegas, Nevada, Session PHY02-3.*
28. "Complexities of ad hoc wireless network architectures and their dual use capabilities for Multi-service QoS assured applications", *Proceedings of IEEE Conference on Enabling Technologies for Smart Appliances, Vol. 1 Key Session ETMA, January 12-14, 2005, Hyderabad, India (Invited Paper).*

D. Synergistic Activities:

Invited Presentations, Lectures and Short Courses:

1. "Cognitive Radio Sensor Networks: Concepts, Issues, Design and Dual Use Applications", **Invited Workshop, Nanyang Technological University and Singapore Industry Consortium, January 7, 2008.**
2. "Management and Control of Highly Mobile Ad hoc Wireless Network for supporting Multi-Service QoS assured Applications", **Invited Workshop, May 19 – 21, 2006, Nokia – University Consortium, Kokkola, Finland.**

Creation of a Center of Excellence:

1. Established Army Research Office (ARO) Center for Battlefield Communications, Department of Electrical and Computer Engineering, Prairie View A&M University, 2004.
2. Established Advanced Telecommunications Institute, a US Navy Center of Excellence, Stevens Institute of Technology, Hoboken, NJ 1994 as the Founding Director.

Organizational and Standards Experience:

1. Chairman of IEEE 802.9 ISLAN Standards Committee, 1992-2001, successfully developed five Standards (including ISO 8802-9). Member of the Committee from 1987-1992.

2. Made Technical contributions to ITU/ISO and Federal ISDN standards.
3. ISO Standards, "Specification of multimedia MIB elements as part of ISO standard", 1995.

Honors & awards:

1. "2008 Outstanding Researcher of the Year, February 22, 2008", College of Engineering, Prairie View A&M University.
2. "Family award for exemplary community services", Frederick, MD, August 16, 2003.
3. "IEEE Medallion Award for Technical Contributions and Development of ISO/IEC 8802-9 Standard that Provides the First Implementation of Simultaneous Access of ISDN and INTERNET Services", December 1996.
4. "Excellence in Service and Impact the Institution to achieve National Preeminence", Stevens Institute of Technology, May 1996.