

George Thomas Ph. D.

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Department of Engineering and Computer Science
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CURRICULUM VITAE

- Current Position:** Professor and Chair, Engineering and Computer Science
Azusa Pacific University, Azusa, CA 91702
- Academic Experience:** Professor and Chair, Engineering and Comp Sci, APU
Head, EECE Department, University of Louisiana, Lafayette
Professor, EECE, UL Lafayette
Associate Professor, EECE, UL Lafayette
Sr. Research Asst., Indian Instt of Science, Bangalore, India
- Industrial Experience:** Manager, INSAT program, ISRO Bangalore
Satellite Communications Engineer (ISRO)
- Education:** Ph.D., Electrical Communications Engineering
Indian Institute of Science, Bangalore, India
- M.E., Electrical Communications Engineering
Indian Institute of Science, Bangalore, India
- B.Sc. (Engg). Electronics and Comm Engineering,
University of Kerala, India
- Research:**
1. Coding applications in wireless and optical networks
 2. Wireless communication systems
 3. Satellite Communication Systems

Recent Activities

I joined the faculty of Engineering Computer Science at the Azusa Pacific University in the Fall of 2016, as department chair, shortly after the launch of the new Engineering degree program in 2015. Program development and recruitment of students and faculty were my early goals. An Industrial Advisory Board was formed in Fall 2016. The original Systems Engineering degree was broadened to a degree in Engineering with two concentrations: Systems Engineering and Computer Engineering. A major update of the curriculum was started in 2017 to reflect this change, and several new courses were developed. Internships were added as required courses for both engineering and computer science. Student chapters of ACM, SWE, and IEEE were promoted. A new engineering lab was started and the pre-existing computer lab was significantly enhanced with new equipment. Undergraduate student research and faculty scholarship and research activities were enhanced, resulting in publications and external funding by the faculty.

Most recently I am engaged in coordinating the preparation for anticipated ABET visit for Engineering program accreditation in Fall 2021. I am also facilitating a faculty initiative for a multi-year senior design project aimed at building and launching a ‘cubesat’ nanosatellite.

An important focus of my recent work has been faith integration in the classroom. Pursuant to APU policy, I have been exploring innovative ideas that link the Christian worldview with engineering and computer science.

Past Activities – Highlights

Department Chair and graduate coordinator roles at the University of Louisiana at Lafayette
Started a Systems Engineering Ph.D. program
Developed and managed an M.S. degree program in Telecommunications
Nation’s first ABET-accredited undergraduate degree option in Telecommunications
CAPE picosatellite program – Two picosatellites in orbit
Led two ABET accreditation Cycles
Indian Space Research Organization (ISRO), Bangalore, India
Manager, INSAT program
INSAT-1 A, B, C launch and operational use
Indian Institute of Science, Bangalore
Ph.D. Research
Teaching
Affiliated to the Center for Information Processing

LIST OF PUBLICATIONS

Refereed Conference Proceedings

"A Select-Channel Approach to Power-Efficiency in OFDM Transmission," IEEE Online Green Communications Conference, November, 2013

"Situation Awareness Issues in Tactical Cognitive Radio," IEEE CogSIMA-2012 Conference, New Orleans, LA, March 2012

"Cognitive Radio Applications in Smart Power Grids," SSCET-2012, New Orleans, October 2012.

"Fast Detection of Spectral White Spaces for Cognitive Radio Networks," Proc. IEEE MILCOM 2009 Conference, Boston, MA, Oct 2009

"OFDM Capacity Enhancement by selective Channel Use," Proc. IEEE MILCOM 2009 Conference, Boston, MA, Oct 2009

"Improving Reverse Channel Efficiency in Passive Optical Networks," Proc. IEEE Advanced Networks and Telecommunications Systems Conference, Mumbai, India, Dec 2007

"Rapid Collision Resolution in Slotted Aloha without Retransmission Delays," Proc. IEEE Sarnoff Symposium, Princeton, New Jersey, April 2007

"Multi-Frame Reservation (MFR) ALOHA Protocols" (with Ivana Petrovic - first author), Proc. IEEE TELFOR 2006 Conference, Paper no. 2-12, Belgrade, November 2006

"Improved Performance in Ethernet Passive Optical Networks", Proceedings of the First International Workshop on Community Networks and FTTH/P/x (CNFT), Dallas, October 2003

"Signal Processing for UWB Sensor Network for Position Location" (with J. R. Avula), Proc. of International Signal Processing Conference, Dallas, March 2003

"Random Access with Multi-Beam Antenna Arrays," IEEE WCNC-2002, March 2002

"New Dynamic Beam-forming Protocol for Wireless Packet Data Networks," Proc of the SPIE ITCOM 2001 Conference on Modeling and design of wireless networks, vol. 4531, pp.238-246, Denver, CO, August 2001

"Burst Switching Architecture for a Video-on-demand Server," Proc of the SPIE ITCOM 2001 Conference on Internet Multimedia Management Systems-II, vol.4519,pp.258-265, Denver, CO, August 2001

"A Rate-Adaptive Protocol For Wireless Data Channels", IEEE Wireless Communications and networking Conference (WCNC-2000), Chicago, IL, Sep 2000

"Analysis and Simulation of a Novel Queueing Strategy for Performance Enhancement of an Indoor Wireless ATM Switch", Fifth INFORMS Telecommunications Conference, Boca Raton, March 2000

"A Heuristic Rate-Adaptive Wireless Datalink Protocol using Shortened Linear Codes over Slowly Fading Channels", Fifth INFORMS Telecommunications Conference, Boca Raton, March 2000

"An Improved Lower Bound to The Throughput of the Collision Channel without Feedback", Proceedings of the 33rd Annual Conference on Information Sciences and Systems, Johns Hopkins University, Baltimore, MD, March 1999

"ATM Switches with Bifurcated Input Queueing", Proceedings of the Sixth International Conference on Computer Communications and Networks (ICCCN-97), Las Vegas, Nevada, September 1997 (with V. Veludandi)

"Impact of Cell Recovery Coding on MPEG Video over Wireless ATM," Proceedings of the 7th IEEE International Symposium on Personal and Indoor Mobile Radio Communications (PIMRC-96), pp.613-617, Taipei, Taiwan, ROC, October 1996

"Compressed Video over Wireless ATM with Fast Cell Loss Recovery," Proceedings of the 3rd International Workshop on Mobile Multimedia Communications (MoMuc-3), paper no. B.2.1.4, Princeton, N.J., September 1996

"Application of VP-Based Error Control Coding in ATM Networks Carrying MPEG Video," Proc. of the 4th Intl. Conf. on Telecom Systems, Analysis and Modeling, Vanderbilt University, Nashville, Tennessee, March 1996

"A New Packet Video Distribution Network Architecture for an On-Demand HDTV Entertainment Video Service," Proc. 6th Intl. Wkshp on Pkt Video, Portland, OR, September 1994.

"Architecture and Performance of Video-on-Demand Networks," IEEE Midwest Symposium on Circuits and Systems, Lafayette, LA, August 1994

"A New Architecture for a Fiber Optic Gigabit Network for On-Demand Delivery of HDTV Video," IEEE Infocom 94, Workshop on Gigabit Networks, Toronto, Canada, June 1994

"Performance Assessment of a Shuffle-Based ATM Switch," IEEE Intl. Conference on Communications (ICC-94) Proceedings, New Orleans, May 1994

"Performance Limits to Multiaccess Tree Protocols with Shared Multi-User Coding," IEEE Globecom 1993, Houston, Nov 1993

"On High Speed Packet Switches with Windowed Input Buffers", IEEE Globecom 1993, Houston, Nov 1993

"A Code-Sharing Group Random Access Strategy Using Multi-User Coding", International Conference on Finite Fields, Coding Theory and Advances in Communications and Computing", University of Nevada, Las Vegas, 1991

"On the Capacity of the Ideal Error-Correcting Collision Channel without Feedback", International Conference on Finite Fields, Coding Theory and Advances in Communications and Computing", University of Nevada, Las Vegas, 1991

"An Adaptive Random Access Protocol for the Collision Channel without Retransmissions", (with J. Miller and S. Champagne), Proc. IEEE Southeastcon-90, New Orleans, April 1990

"Constant-Weight and Even-Weight Codes for the Optical On-Off Channels", Proc. IEEE Southeastcon-90, New Orleans, April 1990

"Coding Techniques for Quantum Limited Photonic Channels", SIAM Conference on Applied Probability in Science and Engineering, New Orleans, March 1990

"Statistical Methods in Random Access Communications", SIAM Conference on Applied Probability in Science and Engineering, New Orleans, March 1990

"Optical Packet Transmission with Erasure Correction Coding", SPIE '91 Conference on Fiber Optic Telecommunication Networks, Dallas, Texas, 1991

Refereed Journals

"A Capture-Assisted Random Access Scheme for Multi-Beam LEO Satellite Packed Data Networks," International Journal of Satellite Communications, vol.22, no.6, pp.629-642, Nov-Dec 2004

"Capacity of the Wireless Packet Collision Channel without Feedback", IEEE Transactions on Information Theory, vol. 46, no.3, pp.1141-44, May 2000

"Multi-Channel Input-Queueing for High Throughput Switches", Electronics Letters, IEE, London, vol.33, pp.184-185, January 1997

"Bifurcated Queueing for Throughput Enhancement in Input-Queued Switches," IEEE Communications Letters, vol.1, No.2, pp.56-57, March 1997

"Improved Windowing Rule for Input Buffered Packet Switches," Electronics Letters, IEE, London, vol.29, no.4, pp.393-395, February 1993 (with J. Man)

"Application of Multiuser Coding in Random Access Protocols," IEEE Transactions on Communications, vol. COM-36, no.8, pp.983-986, August 1988

Book Chapters

"Information Theory of Data Transmission Codes" in *The Wiley Encyclopedia of Electrical and Electronics Engineering*, J. Webster (Ed.), Wiley, 1999

"Role of Wireless in Corporate Networks", in *Telecommunications Network Managers' Handbook*, J. Lusa (Ed.), CRC Press, 1998

"Application of Multi-User Coding in Random Access Protocols," in *Multiple Access Communications - Foundations for Emerging Technologies*, N. Abramson (Ed.), IEEE Press, 1992

LIST OF EARLIER PUBLICATIONS (1972-1988)

Refereed International Conference Proceedings / Digests

"Optimality of Delta Modulator", Proceedings of the 12th Annual Allerton Conference, Urbana, Illinois, 1974

"Modeling and Computation of the Performance of Algebraic Encoders", IEEE International Symposium on Information Theory, Ronneby, Sweden, 1976

"Minimum Distance and Rate-Distortion Capabilities of Linear Block Source Encoders", Proceedings of the 1st International Conference on Information Sciences and Systems, Patras, Greece, 1976

"Rate Distortion Performance of Runlength Encoders", Proceedings of the 1st International Conference on Information Sciences and Systems, Patras, Greece, 1976

"Differential Encoding of Binary Markov Sources", IEEE International Symposium on Information Theory, Cornell University, Ithaca, NY, 1977.

"Indian Domestic Satellite System - INSAT", IEEE International Conference on Communications (ICC-82), Philadelphia, 1982

Refereed Proceedings of International Conferences

"A New Approach to Digital Encoding Schemes", Proceedings of the International Conference on System Sciences, Coimbatore, India, 1973

"Coding for Collision Resolution on Binary Additive Multiaccess Channels", IEEE-IISc International Conference on Computers, Signals and Systems, Bangalore, India, 1984

"Multi-Channel Aloha Protocols without Retransmission Delays", IISc Platinum Jubilee International Conference on Systems and Signal Processing, Bangalore India, 1986

"Random Access Protocols with Multiuser Coding for Collision Resolution", Proceedings of the Indo-US (ONR) Workshop on Systems and Signal Processing, Bangalore, India, 1988

Unpublished Reports

"The Indian National Satellite System - A Case Study", University of Hawaii, 1982

"Coding in Multiple Access Communications", INSAT Technical Report, 1985

TEACHING

Courses Taught at Azusa Pacific University (2016 -)

ENGR 101 Introduction to Engineering
ENGR 210 Engineering Thermodynamics
ENGR 215 Electrical Circuits and Systems
ENGR 271 Advanced Math for Engineers
ENGR 310 Discrete Systems Modeling and Simulation
ENGR 325 Control Systems
ENGR 340 Digital Signal Processing
ENGR 346 Systems Engineering Principles
ENGR 420 Decision and Risk Analysis

Courses Taught at the University of Louisiana at Lafayette (1988 - 2016)

Graduate Courses

EECE 513: Principles of Computer Communication Networks
EECE 613: Advanced Topics in Computer Commn Networks
EECE 669: Special Topics in Comp & Information Systems
TLCM 510: Random Processes (New Course in Spring 92)
TLCM 513: Telecommunication Networks (New Course in Spring 93)
TLCM 521: Lightwave Networks (New Course in Fall 93)
TLCM 524: Mobile and Wireless Communications
TLCM 525: Modeling and Perf Analysis of Comm Systems

Undergraduate Courses

EECE 428: Transmission Media (New Course in Fall 91)
EECE 435: Wireless Communications (Telecom-II)
EECE 452: Communication Engineering - I
EECE 472: Wireless Networks (Spl Topics Course for Seniors)
EECE 333: Telecommunications - I
EECE 355: Circuits and Signals -I
ENGR 201: Electrical Circuits

Short Courses

Developed and taught a 3-day intensive course on "Telecommunications Transmission Techniques - Microwave, Satellite and Optical Systems" for the Amoco Corporation at their Chicago, IL headquarters (August 1990).

Courses Taught while at ISRO, India (1978-1988)

Several short courses on satellite communications, multiple access, coding techniques, etc.

Course Taught while at IISc, India (1972-1978)

A new graduate course on "Data Compression Techniques"

A new graduate course on "Pattern Recognition and Rate Distortion Theory".

Short courses on error-correction coding and computer communication networks.

THESES SUPERVISED

1. "Bifurcated Input Queueing in ATM Switches - A Simulation Study," MS in CS, Venkateshwarlu Veludandi, Spring 1997
2. "Wireless ATM Cell Loss Recovery Methods," MS in Telecom, Aravinda Babu Duggirala, Spring 1997
3. "High Performance Cellular Mobile Communications Networks", M.S. in Telecom, Mohan Kanthaswami, Fall 1998
4. "Performance Evaluation of Bifurcated Input Queued Switches," Richard P. Surendrakumar, Spring 2002
5. "Signal Processing on Ultra Wide Band (UWB) Sensor Position Location Network," Janardhan Reddy Avula, Spring 2003
6. "Slotted Aloha Packet Radio Network with Switched Multi-Beam Array Antenna," Rakesh Bansal, Spring 2003
7. "A Stable Random Access Protocol for Wireless data Networks," Anil Kumar Donthula, Spring 2003
8. "Interoperability of Bluetooth with WiFi (IEEE 802.11b)," Vinoth Gunasekaran, Spring 2003
9. "Polarization Mode Dispersion (PMD) Management in 40 Gbps (OC-768) Optical WDM Systems," Hemalatha Ramakrishanareddy, Spring 2004
10. "Scalable Switching Systems for Inter-connected Passive Optical Networks (PONs)," Srilata Dabburu, Spring 2004

11. "WiFi Interference with Bluetooth: A Simulation Study," Preeti kashid, Fall 2004
12. "Mutual Interference in Wireless Personal Area Networks," Prabhakaran Ayyavu, Fall 2004
13. "Energy Efficient Queue Management for Wireless Networks," Swedha Sivagnanam, Summer 2004
14. "Active Queue Management: A Simulation Study," Swati Apte, Summer 2005
15. "Identification of Important Fading Characteristics for Effective Modeling of Wireless Data Channels," Sriharsha Ogoti, Fall 2005
16. "Multi-Frame Reservation (MFR) Aloha: An Improved Explicit Reservation Protocol," Ivana Petrovic, Summer 2006
17. "A Study and Analysis of Scheduling Schemes in Ethernet Passive Optical Networks for Efficient Channel Utilization," Suman Raj Singh, Fall 2007
18. "A Multi-Frame Contention Mechanism for Improving WiMAX Best-Effort Data Service," Vinay Manchikalapudi, Fall 2007
19. "Adaptive Modulation in Broadband Wireless with OFDMA – Simulation Studies," Arunkumar Sundarrajan Fall 2008
20. "Dynamic Spectrum Access in Wireless Networks," Sudheer Ghanta (2009)
21. "Bandwidth Allocation for OFDMA wireless systems," Prasad Gholap (2010)
22. "Adaptive Modulation for Fading Wireless Channels," Pooja Shah (2011)
23. "Cognitive Radio Networks," Jeo James (2011)
24. "Signal Detection for Cognitive Radios," Ryan Blossom (Summer 2013)
25. "Antennas and Communications for cubesats," Vance Doumit (Fall 2014 planned)

PROFESSIONAL ACTIVITIES

Professional Societies

Member, IEEE
Communications Society
Information Theory Society
Circuits and Systems Society

Reviewer for: IEEE Transactions on Communications
IEEE Education
IEEE Computer Magazine
IEEE Networks Magazine
IEEE Conferences (ICC, Globecom, Infocom, and others)
European Transactions on Communications (ETT)
EURASIP (European Association for Signal Processing) Journal

Conference Sessions Organized/Chaired

International Signal Processing Conference (ISPC-2003, Dallas), Wireless session (C)
IEEE Wireless Communication Networks Conference (WCNC-2002) - Tutorial session (O)
IEEE Wireless Communication Networks Conference (WCNC-2000) - Tutorial session (O)
IEEE Wireless Communication Networks Conference (WCNC-2000) - WATM session (O)
IEEE ICC 2000, New Orleans, LA; session on "Broadband Access Technologies" (O)
IEEE Globecom-99, Rio de Janeiro, Brazil: Session on "Satellite and Wireless Networks" (O)
IEEE Southeastcon-90, New Orleans, 1990: Session on "Computer Networks"(C)
Indo-US (ONR) Workshop on Systems & Signal Processing, Bangalore, India, 1988 : Session on
"Computer Communication Networks" (O&C)
1st International Conference on Information Sciences and Systems, Patras, Greece, 1976:
Session on "Coding" (C)

UNIVERSITY, COLLEGE, AND DEPARTMENTAL COMMITTEES

Azusa Pacific University

Faculty Senate Member
STEM Curriculum Committee Member
Intellectual Property Policy Development Committee Member
Center for Research in Science Advisory Committee Member
Departmental Industry Advisory Committee - Non-member secretary
Faculty Search Committee Chair
ABET Accreditation Coordinator

University of Louisiana, Lafayette

Member, University Distinguished Professor Selection Committee
Member, Graduate Council
Member, Graduate Appeals Committee
Member, Graduate Curriculum Committee
Chair of the Faculty Senate Committee on Academic Planning and Development
Member, Faculty Senate Committee on Academic Planning and Development
Member of the University Committee on Academic Technology
Member of the College Peer Review Committee
Member of the College Tenure Committee
Chair/Member of several departmental committees

MISCELLANEOUS

Invited referee for Photonics Technology research proposals for the European research agency ISMB (Istituto Superiore Mario Boella), Italy (2000)

A paper selected for inclusion in an IEEE Selected Reprints volume: "Application of Multi-User Coding in Random Access Protocols", in *Multiple Access Communications - Foundations for Emerging Technologies*, Norman Abramson (Ed.), IEEE Press, 1992

Held a short-term Fellowship at the University of Hawaii, Honolulu, in 1982, for participation in an international study team on domestic satellite communication systems.

UL Lafayette Summer Faculty Research Award (1991)

External thesis examiner for a 1993 Ph.D. Thesis from the Indian Institute of Science, Bangalore, in the area of wireless mobile communications.