

A. Anil Kumar, Ph.D.

Department of Electrical and Computer Engineering

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Project XLR8: <http://www.pvamu.edu/pages/2794.asp>

Partnership for Innovation in Education (PIE) <http://www.pvamu.edu/pages/2806.asp>

(a) Educational and Professional Preparation

Professional Associate, University of Manitoba, Canada, 9/81-8/83
Research Associate, Simon Fraser University, Canada, 10/79-8/81
Visiting Research Fellow, ESIS Program, University de Liege, Belgium, 5/79-10/79
Research Fellow, University of Warwick, England, Physics, 2/78-5/79
Indian Institute of Science, Bangalore, Ph.D. (Physics), 1978
Indian Institute of Technology, New Delhi, M.Sc. (Physics), 1973
Osmania University, Hyderabad, B.Sc. (Physics), 1971

(b) Appointments

Professor, Electrical & Computer Engineering, 1996-present
Department Head, Physics, 2001-2011
Associate Dean, College of Arts & Sciences, 2001-2003
Director of Research & Special Assistant to the President for Science & Technology, 1998-2001
Associate Dean, College of Engineering, 1997-1998
Associate Professor, Electrical Engineering, 1989-1996
Assistant Professor, Electrical Engineering, 1986-1989
Visiting Lecturer, Electrical Engineering, 1985-1986
Visiting Assistant Professor - Texas A&M University, 9/83-8/85

(c) Recent Publications/Presentations

1. A.A. Kumar, Preparing Students to Onboard Into STEM Careers, TMC Member Universities Professional Institute & Exhibition, *New Orleans, March 15-18, 2009*
<http://www.pvamu.edu/Include/Physics/MUPIE%202009/MUPIE-2009-KUMAR-PREPARING-STEM-MAJORS.pdf>
2. A.A. Kumar, STEM Support to Improve Math and Science Instruction, TMC Member Universities Professional Institute & Exhibition, *New Orleans, March 15-18, 2009*
<http://www.pvamu.edu/Include/Physics/MUPIE%202009/MUPIE-2009-MATH-SCI-KUMAR.pdf>
3. A.A. Kumar and F.-C. Wang, Assessing Student Learning at the Course Level in Science Courses – Can We Reconcile Large Classes, Multiple Choice Tests and True Learning?, Presentation at the 9th Annual TAMU Assessment Conference, February 2009 <http://www.pvamu.edu/pages/5474.asp>
4. Nicole Poenitzsch, Traci Toler, Allan Kaster, Edward Mason, A. Anil Kumar, Critical Issues in School Redesign – Project XLR8: An Innovative School-University Partnership, Presentation at the Annual SACS (Southern Association of Colleges and Schools) Conference, San Antonio, December 2008
<http://www.pvamu.edu/pages/5474.asp>
5. School Reform and Redesign – What They Are and What They Aren't, TMC Member Universities Professional Institute & Exhibition, *Charlotte, March 2-4, 2008*
http://www.pvamu.edu/Include/Physics/Marshall_gates/MUPIE%202008/KUMAR-CHARLOTTE-PRSN-WEB.pdf

Other Publications:**Software/Hardware Systems Under Development (Under Consideration for Technology Transfer):**

1. CSPIFF - Circuit Simulation Program In the Presence of Fatal Faults for reliability and fault-tolerance of large scale electronic systems
2. CSIM - Communication Systems Simulator for simulation of arbitrary communication systems
3. BCCHS – Bone Conduction Headset – a novel communication system designed for NASA-JSC and demonstrated at NASA JSC Inspection Days '99.

(d) Synergistic Activities

1. Project XLR8: A high school redesign program funded by the Thurgood Marshall College Fund and the Bill and Melinda Gates Foundation (Recipient of the Outstanding Achievement Award for School Reform, 2009)
2. Mentor-Protégé Program and Small Business Mentoring Activities, funded by SBA, EPA and DARPA through the Science & Engineering Alliance (1999-2006)
3. Enhancement of the Learning and Experiential Environment of Physics Majors and Minors, Title III funding (2002-2007)
4. Lead Science Cohort, Texas A&M University System's Regents Initiative for Excellence in Education (one of five faculty recipients in the nine university system of the Outstanding Achievement Award, 2004)
5. Previous efforts include: Received and managed, as a single principal investigator, \$1M worth of research during '93-'99 from agencies including: the Army, NASA, DOE, Motorola and Texas. Most recent technical work has been in the area of signal and image processing, and scientific database development for potential applications in digitized battlefield scenarios and communication network security. Also contributed extensively to College level and University level research by authoring proposals in a variety of disciplines including: education, manufacturing, radiation, and community economic development.

(e) Collaborators & Other Affiliations

1. Richard Alo, Professor of Computer and Mathematical Sciences at and Executive Director for Center for Computational Science and Advanced Distributed Simulation, University of Houston-Downtown
2. Edward L. Mason, Department Head, Curriculum and Instruction, Prairie View A&M University
3. Several high school teachers

(ii) Other Personnel

Several faculty, undergraduate and graduate students mainly from Electrical and Computer Engineering, and one student from Psychology

BRIEF SUMMARY OF RESEARCH THROUGH 2001:

- **1997-present:** While continuing to work on large-scale proposals, completed a feasibility study of business and technology incubators for the US Department of Labor, established a Wireless Application Enterprise Network with a grant from Microsoft/United Negro College Fund, designed and displayed (at the NASA-JSC Inspection '98) a novel communication device (Bone Conduction Headset) with a grant from NASA-JSC, and established a Small Business Mentoring Program. A large contracting vehicle – Minority Institutions Technology Support Services (MITSS) – has been established with Defense Information Systems Agency.

- **1992-1997:** Completed a project with the Department of Energy on digital image libraries, a project with US Army CECOM on developing a novel simulation program for simulation of communication systems (CSIM), and a project with Motorola, Inc. on electromagnetic interference and compatibility. Five graduate students and several undergraduate students participated. Also, as the Director of Research for the College of Engineering and Architecture, written proposals for several funded projects, notably the Laboratory for Radiation Studies and the Waller County Community Center.
- **1989-92:** Worked on reliability and fault-tolerance of VLSI systems (funded by NASA/JSC), at the system and device levels. This work comprises of both analytical and computational approaches. A new approach to reliability of large-scale systems is being written up as a publication. Also, a new comprehensive computer simulation program – Circuit Simulation Program Including Fatal Faults (CSPIFF) – for large-scale electronic circuits with catastrophic faults was written. Two graduate students and several undergraduate student worked on these projects. Completed research on design of microwave devices involving high temperature superconductors (funded by the Texas Advanced Technology Program).
- **1985-88:** Worked on some problems related to amorphous photovoltaics - in particular, recombination lifetimes. (This research was supported by SERI; A.A. Kumar, P.I.)
- **1983-85:** Worked on the problem of transition metal impurities at semiconductor surfaces. A short presentation of this work was made at the APS March Meeting, Detroit, 1984. (Computations were done on the VAX 11/780, 11/782.) Also worked on problems of surface sound in 4He films and macroscopic dynamics of XY spin glasses (with W.M. Saslow). Have finished some preliminary calculations on the electronic energy level structure of small clusters with particular reference to alkaline metal promotion and poisoning during CO and carbonyl desorption at Ni and Ru surfaces (with T.J. Humphreys, E-Systems).
- **1981-83:** Worked on a new computational method for the calculation of the density-of-states of disordered systems via a real-space renormalization group approach (with Southern and Loly). (Computations were done on the IBM compatible hardware - Amdahl 470V6.)
- **1974-81:** Work consisted mostly of the study of localization and transport in disordered systems (with Kumar, Heinrichs and Butcher). The transport aspect included the formulation and calculation of the electrical conductivity both from a semi-phenomenological (percolation theoretical) and microscopic (master equation) points of view. This work has been extended to include the magnetic field (the Hall mobility). The work on the Hall effect is being written up as a major chapter in a book on Amorphous Systems that I am currently writing.

RELEVANT TECHNICAL ADMINISTRATIVE EXPERIENCE:

University Level:

- Co-Director, SACS Executive Leadership Team, Southern Association of Colleges and Schools Self-Study (1999-2001)
- Director of Research and Special Assistant to the President for Science and Technology (1998-2001)
- Developer/Manager of successful large scale (multi-million dollar) research, education and training proposals for NASA, ARMY, DOD, Texas, Housing and Urban Development, and others in the areas of radiation, manufacturing, materials, infrastructure development, education, etc.
- Organizer/Technical Chairperson of the Engineering & Architecture Symposia ('93 - '96) and the Radiation Symposium ('93), PVAMU
- Member of TQM Group on Research & Graduate Programs.
- Director of Research and Assistant to the Dean for Research Development, Engineering & Architecture (1992-1995)
- Member, University Reorganization Committee
- Assistant to the Director of Research and Dean

of Graduate School (1996-1997) • Associate Dean for Research & Graduate Programs (1997-1998) • Member, Legislative Affairs Team (1997-present) • Chair/Member, several committees on ABET accreditation in Electrical Engineering

State and National Levels:

• Member, CECOM Center of Excellence in Communications, North Carolina A&T State University • Member, External Advisory Board, NASA Center of Excellence, Clark Atlanta University • Member, IEEE National EMI/EMC Education Committee • Member, National Steering Committee, Science & Engineering Alliance (SEA) • Member, Technical Advisory Panel, Texas Department of Transportation • Member, NSF Advisory Panel (1997, 1998) • Member, DOD-ARL Review Panel (1998) • Member, Technology Incubator Committee, Cy-Fair Chamber of Commerce (1997-1998) • Chair, several specialized technical committees of various alliances, e.g., Science & Engineering Alliance (SEA) and HBCU/MI Research Alliance (HMIRA) • Panel Member, National Security Education Program (2000)

Student Education and Mentorship:

All my research projects have substantial student involvement at the graduate and undergraduate levels. During 1992-1999, nine graduate students have completed their Master's theses and numerous undergraduates have been involved in research in my group. I have also worked with and mentored eight NASA Sharp Plus Program students for three consecutive summers (1995-1997).