

CURRICULUM VITA

AFZEL NOORE

Professor and Associate Dean of Undergraduate Affairs
The Frank H. Dotterweich College of Engineering
Texas A&M University-Kingsville
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BACKGROUND

Education

Ph.D.	Electrical Engineering	West Virginia University	1987
M.S.	Electrical Engineering	Indian Institute of Technology, Madras	1981
B.E.	Electronics & Comm.	Engineering, University of Madras, India	1977

Employment

2018 – Present	Associate Dean for Undergraduate Affairs College of Engineering, Texas A&M University-Kingsville
2020 – Present	Interim Department Chair Industrial Management & Technology, Texas A&M University-Kingsville
2018 Dec	Interim Department Chair
2019 Aug	Electrical Engineering & Computer Science, Texas A&M University-Kingsville
2009 – 2017	Associate Chair for Academic Affairs Dept. of Computer Science & Electrical Engineering, West Virginia University
2007 – 2017	Professor Dept. of Computer Science & Electrical Engineering, West Virginia University
2003 – 2003	Special Assistant to the Dean College of Engineering and Mineral Resources, West Virginia University
1996 – 2002	Associate Dean for Academic Affairs College of Engineering and Mineral Resources, West Virginia University
1992 – 2007	Associate Professor Dept. of Computer Science & Electrical Engineering, West Virginia University
1987 – 1992	Assistant Professor Dept. of Computer Science & Electrical Engineering, West Virginia University
1982 – 1986	Teaching Fellow, Department of Electrical Engineering, West Virginia University
1980 – 1982	Product Development Engineer, Digital Design Group, Philips India. Developed LED and LCD based microprocessor multimeter models in collaboration with Philips Eindhoven, Holland. Both products were successfully commercialized.

Awards

Teaching

- West Virginia University Foundation Outstanding Teacher Award - 1996
(awarded to six faculty in the University)
- Teacher of the Year Award – 1994, 1996, 2005
(awarded to one out of 140 faculty in the College)
College of Engineering and Mineral Resources, West Virginia University
Outstanding Teaching Award – (awarded to five out of 140 faculty in the College)
1988, 1990, 1993, 1994, 1995, 1996, 2005, 2008, 2011, 2015
College of Engineering and Mineral Resources, West Virginia University
- Outstanding Graduate Teaching Award - 1991, 1993, 1994, 1995, 1996
(awarded to five out of 140 faculty in the College)
College of Engineering and Mineral Resources, West Virginia University
- Outstanding Teaching Award
Lane Department of Computer Science and Electrical Engineering
1988, 1990, 1991, 1993, 1994, 1995, 1996, 2005, 2006
- Outstanding Graduate Teaching Fellow Award – 1985-S, 1985-F, 1986-S
Department of Electrical Engineering, (awarded to one Teaching Assistant)

Research

- Researcher of the Year Award – 2008
(awarded to one out of 140 faculty in the College)
College of Engineering and Mineral Resources, West Virginia University
- Outstanding Researcher Award – 2006, 2008, 2010
(awarded to five out of 140 faculty in the College)
College of Engineering and Mineral Resources, West Virginia University

Service

- IEEE Service Award - 1991, 1992, 1993, 1994
Consumer Electronics Society

Honors

- IEEE Senior Member, 2012
- West Virginia University Faculty Class Advocate for the Class of 2002,
1998 – 2002 (Appointed by University Provost and President)
- College Award for Planning and Coordinating the Accreditation of Engineering
Programs, 1998
- West Virginia University – WVUIT Merger Task Force, 1995
(Appointed by President Hardesty)
- Academy of Outstanding Teachers, 1996 - 2017
College of Engineering and Mineral Resources, West Virginia University

- Excellence in Innovative and Distinguished Teaching
International Directory of Distinguished Leadership, 1990
- Founding Editor, IEEE Consumer Electronics Society Newsletter, 1993 – 1994
- Outstanding Young Man of America, 1988 and 1989
- Tau Beta Pi, National Engineering Honorary
- Eta Kappa Nu, Electrical and Computer Engineering Honorary
- Phi Kappa Phi, Honor Society
- Epsilon Pi Tau, International Honor Society for Technology
- Sigma Xi, Scientific Research Honor Society

ADMINISTRATIVE EXPERIENCE

**Associate Dean for Undergraduate Affairs
College of Engineering
Texas A&M University-Kingsville
January 2018 - present**

Responsible for providing leadership and support to department chairs and faculty related to undergraduate programs; assists the Dean in academic matters and is responsible for the quality of all undergraduate programs in the College; presentations at new student orientation; coordinates and provides leadership on ABET and ATMAE accreditation of undergraduate engineering, computer science and technology programs; oversees student outreach, recruitment, and retention activities; oversees the Engineering Student Success Center (tutoring, student organizations, professional advising for at-risk students, internship opportunities, and scholarship awards); coordinates College-wide Senior Design Conference; certifies undergraduate students for graduation; develops articulation agreements with national and international universities; and works with the Texas Higher Education Coordination Board for approval of new degree programs.

**Interim Department Chair
Industrial Management & Technology
Texas A&M University-Kingsville
August 2020 – August 2021**

Responsible for providing leadership in ATMAE accreditation; providing leadership in undergraduate and graduate curriculum development; recruiting and mentoring new faculty; making teaching assignments; developing new undergraduate and graduate programs; offering online courses; developing a strategic plan for the department; implementing strategies for increasing enrollment and retention of undergraduate and graduate students; and evaluating faculty for promotion, tenure, and annual evaluation.

**Interim Department Chair
Electrical Engineering & Computer Science
Texas A&M University-Kingsville
December 2018 – July 2019**

Responsible for managing departmental budget, providing leadership in undergraduate and graduate curriculum development, strategic planning, recruiting and mentoring new faculty, making teaching assignments, developing new undergraduate and graduate programs, providing leadership in accreditation planning of electrical engineering and computer science programs, implementing strategies for increasing enrollment and retention of undergraduate and graduate students, evaluating faculty for promotion, tenure, and annual evaluation.

**Accreditation Preparation and Coordination – 2018 through 2022
Texas A&M University-Kingsville**

- Engaged the faculty and prepared 30-day due process response for the new Natural Gas Engineering program. The Natural Gas Engineering program was accredited in August 2019.
- Reviewed 9 self-study reports covering engineering, computer science, and technology programs for ABET and ATMAE accreditation.
- Started an ABET Leadership Team to coordinate the Fall 2021 virtual visit.
- Implemented changes to the ABET assessment process.

**Coordinator of CS101 Introduction to Computer Application
Lane Department of Computer Science and Electrical Engineering
West Virginia University
January 2004 - 2017**

Over 60 CS101 sections are offered every year with an average enrollment of over 3000 students. Major responsibilities include: recruit, train, and mentor qualified GTAs, instructors, and proctors for teaching CS101. Assess student learning and periodically update the topics as technology evolves. Plan lab upgrades and handle student related problems. Evaluate new textbooks and software for possible adoption in the course. Oversee the management of systems to support both instructors and students. Coordinate summer courses based on revenue model.

- Develop projects and assignments to emphasize problem-solving and critical thinking rather than mastering basic computer skills.
- The change was synergistic with the University making a transition from the Liberal Studies Program (LSP) program to the new diverse General Education Curriculum.
- Projects and assignments are centrally developed to support instructors and ensure consistency across all sections.
- Web-based online sections were offered to include adult learners and for professional development.
- Assignments and instructor teaching material were updated to reflect changes in Microsoft Office.

**Associate Department Chair for Academic Affairs
Lane Department of Computer Science and Electrical Engineering
West Virginia University
January 2009 - 2017**

The Department has around 40 faculty and offers the following programs - Computer Engineering, Computer Science, Electrical Engineering, Software Engineering, Cybersecurity, and Biometric Systems. Major responsibilities include scheduling of courses, recruiting quality graduate teaching assistants, offering graduate teaching assistantships, mentoring graduate teaching assistants, organizing orientation workshop for graduate teaching assistants, and providing leadership in program assessment and continuous improvement. Assisted Department Chair with prioritizing and planning departmental academic support activities and personnel-related decisions.

**Special Assistant to the Dean
College of Engineering, West Virginia University
Jan 2003 – Dec 2003**

Responsible for providing leadership in the College for planning, coordinating, and working with Department Chairs and selected faculty to prepare all undergraduate engineering programs and graduate applied science programs for ABET accreditation. A major responsibility was to educate all constituencies regarding the transition to the new ABET 2000 criteria with special emphasis on developing program educational objectives and assessing student outcomes.

ABET Preparation and Coordination - 2003

- Authored Volume-2 of ABET Self Study report on background information pertaining to the Institution and the College. Topics include: mission statement, computing and library support, finances, personnel policies, admission requirements, graduation requirements, and certification process.
- Reviewed 11 Self-Study reports, performed curriculum analysis, performed transcript analysis and provided feedback to Department Chairs.
- Coordinated ABET assessment and provided support material to departments for Freshman Engineering, and courses such as Math, Physics, Chemistry, English, Economics, and Geology.
- Coordinated ABET on-campus accreditation visit for 9 undergraduate engineering programs (EAC) and 2 applied sciences graduate programs (ASAC) in the College with ABET Team Chairs, Department Chairs, and key personnel from University Administration.
- Prepared executive summary before ABET on-campus visit for key administrators – President, Provost, Dean, Vice-President of Student Affairs, Dean of Libraries, Director of Information Technology Resource Center, and Director of Institutional Analysis and Planning.
- Coordinated mock visit and provided feedback to each program before the actual on-campus ABET site visit on materials displayed for evaluation.

- Prepared formal responses to ABET, including 7-day and 30-day due-process response on behalf of the College to address any concern raised by ABET visiting team.

Accomplishments

- All 9 undergraduate programs received the maximum accreditation.
- The graduate programs were accredited under the new guidelines of ABET and received 3 years of accreditation.

**Associate Dean for Academic Affairs
College of Engineering, West Virginia University
February 1996 – December 2002**

Responsible for Freshman engineering program, Co-op and internship program, recruiting and retention, new student orientation, student records, certification of students for graduation, reviewing and approving new graduate and undergraduate courses, coordinating scholarships, updating undergraduate and graduate catalogs, coordinating graduate and undergraduate program reviews, and serving as the Dean's liaison to the College Undergraduate Academic Affairs Committee, College Academic Standards Committee, and College Scholarship Committee.

Leadership in establishing Academic Policies for merged Academic Units

During my tenure as Associate Dean for Academic Affairs several mergers occurred. My role was to review all academic policies and procedures and develop common policies for the newly formed academic units.

- 1995 - The College of Engineering (COE) and the College of Mineral and Energy Resources (COMER) merged to form the new College of Engineering and Mineral Resources (CEMR). My role was to ensure a common Freshman Engineering program, uniform admission policies, graduation requirements, and other academic affairs policies and procedures.
- 1996 - West Virginia Institute of Technology merged with West Virginia University as a regional campus. I was appointed by President Hardesty and Provost Lang to serve in the President's Task Force to identify the challenges and academic opportunities of this merger. Subsequent program alignment of engineering and computer science programs were undertaken to make it easy for students to transfer to West Virginia University and earn their degrees not available at West Virginia University Institute of Technology campus. The program and curriculum were modified so that there was no delay in graduation due to the transfer.
- 1997 - The Computer Science Department in the Eberly College of Arts and Sciences merged with the Electrical and Computer Engineering Department in the College of Engineering and Mineral Resources. The new Department was known as the Department of Computer Science and Electrical Engineering. I developed the proposal for the new degree program which was approved by the Senate and the Board of Trustees.

- 1998 – The Safety and Environmental Management Department merged with the Industrial Engineering Department to form the Industrial and Management Systems Engineering Department. The graduate program in Safety and Environmental Management went through an internal program review leading to several curricular changes that also helped in preparing for ABET accreditation for the first time.

Upgraded the Freshman Engineering Courses

The Freshman engineering program which serves over 600 students was updated to synergistically evolve with the national trend. In an effort to rejuvenate the freshman engineering experience, several changes were made starting in 1996.

- Developed common freshman program after the College of Engineering merged with the College of Mineral and Energy Resources in 1995.
- Developed a new orientation and academic success course to help freshman students succeed and improve retention.
- Recruited outstanding faculty instead of graduate teaching assistants to teach freshman engineering classes.
- All freshman instructors were provided with undergraduate teaching assistants.
- Launched an annual Freshman Design Fair to showcase student projects and their learning accomplishments.
- Introduced the use of portfolios to assess student learning.
- Modernized freshman classrooms to facilitate teamwork and computer use.

Accomplishments

- The freshman program received visibility within the state and the nation.
- Student projects were showcased nationally (CNN) and in the state (TV and newspaper coverage).
- The freshman retention rate improved.

Accreditation of undergraduate programs

- Authored the College self-study report for all engineering programs.
- Coordinated the 1997 on-campus visit with ABET headquarters, ABET Team Chair and program evaluators.
- Coordinated the accreditation visit with colleges that support the engineering programs and key administrators such as the Dean, the Provost, and the President.
- Reviewed self-study reports of nine engineering programs prepared by departments and provided feedback.
- Reviewed for consistency between the West Virginia University and WVUIT (regional campus) ABET reports after the merger.

Accomplishments

- All engineering programs received the highest accreditation.
- The new co-op program was accredited by ABET.
- The College received the best accreditation record in its history.

Accreditation of graduate programs

- Authored the College ABET self-study report for applied science graduate programs.
- Coordinated the on-campus visit in 1997 and 2000 with ABET headquarters, ABET Team Chair and program evaluators.
- Coordinated the accreditation visit with Health Sciences, NIOSH, off-campus sites, libraries, Dean, Provost, and President.
- Reviewed the self-study reports of the two applied science graduate programs prepared by departments and provided feedback.

Accomplishments

- Two applied science graduate programs received ABET accreditation for the first time.

Co-op and Internship Programs

- The first co-op office was established in the College in 1996.
- Recruited the first co-op and internship program coordinator.
- Established the process for placing students in the industry.
- Established the process of tracking student progress and employer satisfaction.
- Coordinated the co-op curriculum with individual departments.

Accomplishments

- The co-op program was nationally accredited by ABET in Fall 1998
- More companies are involved in recruiting our students for the co-op program.
- Periodic assessment of the co-op experience showed that companies are pleased with the quality of West Virginia University engineering and computer science students.

Career Services Office

- Opened a satellite career services office in the College of Engineering to assist engineering and computer science students in job placement activities.
- This facilitated new corporate relationships to be developed and many companies participated in the career fair organized by the College.

Board of Trustees Program Reviews - 1996

- Authored the self-study report for all Engineering Ph.D. programs.
- Authored the self-study report for the M.S. program in Engineering.
- Reviewed all 9 undergraduate engineering self-study reports.
- Reviewed all 11 graduate program self-study reports.
- Coordinated the reviews with departments.
- Served in the Board of Trustees Program Review Committee and reviewed over 40 self-study reports in engineering, math, physics, chemistry, computer science reports from different colleges and universities in the state of West Virginia.

Accomplishments

- The Board of Trustees reviews for all programs were positive.
- Three undergraduate programs were designated by the Board of Trustees as *Programs of Excellence*.

Graduate Council Ph.D. Program Reviews – 1997 and 2000

- Coordinated and reviewed the 9 Ph.D. program self-study reports before submitting for a formal review to the West Virginia University Graduate Council.

Board of Governors Program Reviews - 2001

- Coordinated and reviewed the self-study reports of 12 undergraduate programs and 14 graduate programs.

Program Assessment Framework

- Developed a uniform framework for presenting assessment outcomes for engineering programs.
- Invited to present a talk on *Assessment in Higher Education* to West Virginia Association of Academic Administrators from across the state.
- Developed and coordinated a comprehensive Freshman Engineering Student Experience Assessment including Math, Chemistry, Physics, English, and Engineering courses.
- Developed a graduating student survey for undergraduate and graduate students.
- Provided assessment guidelines, sample employer survey and alumni survey for departments to modify and adapt.

Accomplishments

- Freshman student assessment report highlighted the strengths and weaknesses of different freshman courses (English, Math, Physics, Chemistry, and Engineering).

- The graduating student survey on the web was a pilot program in the University.

Delivering Freshman Engineering Courses to High School Students

- Freshman Engineering Design and Analysis course was developed and offered to students from Liberty High School, Robert C. Byrd High School and Doddridge County High schools via the Internet.
- A pilot section was also offered to engineering students on campus to assess learning outcomes.
- The quality and course expectations were the same for West Virginia University freshman students and high school students.

Accomplishments

- The distance learning course has been well received by students, teachers and parents.
- The initiative was covered by several newspapers and KDKA-TV, Pittsburgh.

Forensic Identification Program

- Member of the Admissions and Curriculum Committee of the new Forensic and Investigative Science degree program.
- Coordinated recruiting, co-op and internship opportunities for Biometric Systems and Forensic Science degree programs.

Summer School

- Implemented a uniform faculty salary structure to support the new entrepreneurial model for summer school.
- Managed summer school through mergers of the two colleges, and the merger of the Computer Science Program within the Computer Science and Electrical Engineering Department.
- The summer school program was run on a revenue-based model that considered in-state and out-of-state student tuition and fees, and faculty salaries to maximize revenue streams for the college and departments.

Extended Learning Courses

- Coordinated the off-campus courses in Software Engineering, offered at Charleston and Fairmont with the Division of Extended Learning, West Virginia Institute of Technology, and the Computer Science and Electrical Engineering Department.
- Coordinated the off-campus courses in Safety Management, and Industrial Hygiene through West Virginia University Extended Learning.

Faculty Class Advocate

- Appointed by the President and Provost to serve as a faculty advocate for the class of 2002, comprising of over 3500 freshman students. This was part of a broader initiative to transform the university to a student-centered institution.
- Developed an integrated prototype advising system based on student input to empower students develop their own class schedule, link available courses with catalog descriptions, give faculty access to student information at the click of a button, and provide administrators with information on student profiles.
- The system enhances the advising process by allowing students to spend quality time with their advisors.

Accomplishments

- The University invested in a commercial student portal called Campus Pipeline to provide similar features when linked to the Banner System from SCT.
- Served as a faculty focal point for the Campus Pipeline university-wide initiative.

Recruiting

- Facilitated the initial redesign of the recruiting brochures to enhance marketing of undergraduate programs.
- Helped to focus on tracking recruiting activities better.
- Required developing a comprehensive database of students who have taken both the ACT and the SAT exams.
- Increased recruiting by organizing college visitation days, telethon activities, contacts with high school teachers, and hosting Math Counts, and Junior Engineering & Technology Society student competitions.
- Coordinated scholarship awards for incoming freshman students.

Accomplishments

- The College freshman enrollment increased by 30%, 25% and 10% in three successive years tracked.

Developed Articulation Agreements

- Developed articulation agreements between the College of Engineering and Mineral Resources and selected colleges in West Virginia and other states. This enabled students to transfer to West Virginia University engineering programs without any deficiencies.
- Coordinated with administrators from West Virginia state colleges and universities (Potomac State College, Marshall University, WVU-Parkersburg, Bluefield State College, West Virginia University Institute of Technology, Shepherd University, and West

Virginia State University) to discuss and exchange ideas on: new engineering degrees and course offerings, changes in curriculum, transfer of credits for advising students.

Development of New Computer Science Courses and Programs

- Coordinated the approval of the new online Software Engineering program by working closely with the Computer Science faculty and NASA. The MS degree program is nationally ranked by the US News and World Report among the top 30 programs.
- Developed and introduced Python and R programming courses for non-CS majors.
- Contributed to the development of the Cybersecurity BS degree program.



TEACHING



Teaching Philosophy

I have taught undergraduate and graduate level courses. One of the pedagogical challenges I face every time I teach a class is to remind myself that students have disparate academic preparedness, varying levels of motivation, and diverse learning styles. By carefully synthesizing cycles of teaching, student learning and assessment, I tailor my teaching strategies to maximize student learning. I like to challenge all students to meet higher expectations. I work closely with those students who need extra help outside class so they can be better prepared, effectively participate in class, and engage in the active learning process. To enhance student learning and provide a broader perspective, I complement my lectures with real-world applications or integrate cutting edge research in selected topics.

Teaching Awards

Student evaluation of instruction and evaluation of instruction by peers has been consistently high. I was recognized 18 times for Outstanding Teaching in the College. I was selected three times as the Outstanding Teacher of the Year from among 140 faculty in the College. In addition, I was recognized as one of six Outstanding Teachers at the University level.

West Virginia University Instructional Improvement Network

I was one of three founding co-coordinators of an informal Instructional Improvement Network at West Virginia University. The other two faculty colleagues were from the College of Human Resources and Education. The goal of the network was to promote excellence in teaching and learning through collegial support. It was aimed at sharing experiences and mentoring young faculty with teaching strategies for collaborative learning, interdisciplinary instruction, inquiry-based learning, teaching large sections, and techniques for motivating students.

Teaching Grants for Curriculum Innovation

- The recent NSF project as Co-PI focuses on a systemic approach to coordinate the programmatic initiatives with proactive support services and high-impact enrichment activities. This forges a pervasive sustainable reform effort to ensure improved student success and seamless transition as students enter Texas A&M University-Kingsville from high schools as freshmen or as transfer students from community colleges.
- I was awarded a teaching grant from ASEE (American Society of Engineering Education) for developing an innovative interdisciplinary course that provided graduates with an understanding of both technical and business issues that are traditionally not covered in either engineering or business degree programs. This was one of 10 projects selected in the country. The real-world case study material was developed for MBA graduate students and undergraduate senior design engineering students working in teams and collaborated with an industry partner.
- Received an NSF grant on Science, Technology, Engineering, and Mathematics (STEM). This grant is an interdisciplinary collaborative effort between the Eberly College of Arts & Sciences, College of Engineering and Mineral Resources, and the College of Human Resources and Education. Teams of faculty, graduate students, and middle school mathematics and science teachers, were involved in developing interdisciplinary instructional modules and lesson plans. They jointly designed research investigations, collected and analyzed data, and prepared a work sample appropriate for assessing the investigation. The interactive research exercises improved teacher's understanding of science content, and their use of inquiry and scientific method to teach STEM subjects.
- I also received several teaching grants from Westinghouse, DuPont, General Electric, National Science Foundation, National Consortium for Technology in Business, National Biometric Security Project, and NASA.

Freshman Engineering Program Development

As Associate Dean at West Virginia University, I provided leadership in modernizing the freshman engineering program by coordinating with the Office of Student Affairs and the College of Engineering aimed at the new university-wide freshman experience initiative. A one hour orientation and academic success course was developed for engineering students to become familiar with different engineering disciplines, the career paths for each major, and study skills. Freshman engineering courses were made more rigorous and projects were based on mathematical modeling, analytical approach and formal design. All freshman engineering students were required to showcase their projects in a Design Fair, which was open to faculty, staff, students, and the public. These projects generated a lot of enthusiasm among students. The design projects received local, national and international coverage, including CNN. MatLab and C programming languages were first introduced with the objective to train students to formulate, analyze, and solve engineering problems. All these changes in the Freshman Engineering program along with support from the Math, Physics, and Chemistry departments improved the retention rates of freshman students.

CS101 Program Development

As Associate Chair of the Lane Department of Computer Science and Electrical Engineering I coordinated over 60 sections of CS 101 a year. Approximately 10% of the students in the University enroll in the introductory computer applications course. The content of the course was recently revised to emphasize problem-solving, math skills and scientific inquiry. Instead of familiarizing with Microsoft Office, students used these applications as tools to analyze data, solve problems, perform simple statistical analysis, visualize the results graphically, and develop critical thinking. The projects include real-world problems selected from disciplines such as science, mathematics, engineering, environment, social science, behavioral science, and business. The proposed changes in CS101 course is designed to integrate technology effectively in the curriculum and also meet the requirements of the new General Education Curriculum.

In 2016, I coordinated the development and introduction of two new courses in Python and R programming for non-CS majors.

Undergraduate Courses Developed

Texas A&M University, Kingsville

- GEEN 1201 Engineering as a Career
Freshman hands-on project course using Raspberry Pi and Python to design a robot.

West Virginia University

- Introduction to Computer Applications – 2007, 2010, 2013, 2015, 2016
- Intro. to Computer Applications (new General Education Curriculum) – 2005, 2006
- Collaborative Decision Making and Problem-Solving in a Multidisciplinary Environment (for engineering and business students) - 1994
- Freshman Engineering Analysis and Design using C Programming - 1993
- Fault-Tolerant Computing - 1988

Graduate Courses Developed

- Quantum Computing - 2007
- Switching Circuit Theory (with VHDL) - 2006
- Switching Circuit Theory - 2005
- Software Metrics - 2001
- Special Topics on ASIC Design and Test - 1990
- Application of Queuing Theory to Computer Systems - 1990
- Fault Tolerance through Reconfiguration in VLSI and WSI Arrays - 1989
- Fault-Tolerant computing - 1988
- VLSI Design and Testing - 1988

Undergraduate Courses Taught

Texas A&M University, Kingsville

- GEEN 1201 Engineering as a Career
Taught freshman students the project-based course to design a robot using Raspberry Pi.

West Virginia University

- Freshman Engineering Design
- Freshman Engineering Design (Honors Section)
- Freshman Engineering Design and Analysis
- Introduction to Electronic Instrumentation
- Digital Electronics Laboratory
- Introduction to Digital Logic Design
- Introduction to Computer Architecture
- Introduction to Microprocessor Based Design
- Senior Design Seminar
- Senior Design Project
- Digital System Design

Graduate Courses Taught

- Switching Circuit Theory
- Quantum Computing
- VLSI Design
- VLSI Testing Techniques
- Special Topics on ASIC Design and Test
- Application of Queuing Theory to Computer Systems
- Fault tolerance in VLSI and WSI Arrays
- Fault Tolerant Computing
- Software Metrics

Graduate Students Advised and their Accomplishments

Names: N. Kohli, D. Yadav, M. Vatsa R. Singh, and A. Noore
Research: Synthetic Iris Presentation Attack using iDCGAN
Accomplishment: Best Paper Award at IEEE International Joint Conference on Biometrics (IJCB), 2017.

Names: M. Singh, S. Nagpal, R. Singh, M. Vatsa, and A. Noore
Research: Gender and Ethnicity Classification of Iris Images using Deep Class Encoder
Accomplishment: Best Paper Award at IEEE International Joint Conference on Biometrics (IJCB), 2017.

Names: D. Yadav, N. Kohli, P. Pandey, R. Singh, M. Vatsa, A. Noore
Research: Effect of Illicit Drug Abuse on Face Recognition
Accomplishment: Best Paper Award at IEEE Winter Conference on Applications of Computer Vision, 2016.

Names: H.S. Bhatt, S. Bharadwaj, R. Singh, M. Vatsa, A. Noore, and A. Ross
Research: On Co-training Online Biometric Classifiers
Accomplishment: Best Poster Award at Third IEEE Conference on Biometrics: Theory, Applications and Systems, 2011.

Names: Richa Singh, Mayank Vatsa, Arun Ross, and Afzel Noore
Research: Online learning in Biometrics: A case study in face classifier update.
Accomplishment: Best Poster Award at Third IEEE Conference on Biometrics: Theory, Applications and Systems, 2009.

Names: Mayank Vatsa, Richa Singh, Afzel Noore, and Keith Morris
Research: Simultaneous latent fingerprint recognition: A preliminary study.
Accomplishment: Best Paper Award at Third IEEE Conference on Biometrics: Theory, Applications and Systems, 2009.

Names: Mayank Vatsa and Richa Singh
Research: Unification of Evidence Theoretic Fusion Algorithms: A case study in Level-2 and level-3 Fingerprint Features
Accomplishment: Best Paper Award at First IEEE Conference on Biometrics: Theory, Applications and Systems, 2007.

Names: Mayank Vatsa and Richa Singh
Research: Unification of Evidence Theoretic Fusion Algorithms: A case study in Level-2 and level-3 Fingerprint Features
Accomplishment: Honeywell Best Student Paper Award at First IEEE Conference on Biometrics: Theory, Applications and Systems, 2007.

Names: Mayank Vatsa and Richa Singh
Research: Multimodal Fusion of SVM Enhanced Deformed Biometric Images
Accomplishment: Third Prize, Sigma Xi Research Poster Award, WVU April 2006.

Names: Richa Singh and Mayank Vatsa
Research: Performance Enhancement of 2D Face Recognition via Mosaicking
Accomplishment: Best Student Paper Award at Fourth IEEE Workshop on Automatic Identification Advanced Technologies (AUTOID), October 2005.

Names: Richa Singh and Mayank Vatsa
Research: Recognition of Faces with Variations in Disguise
Accomplishment: Best Paper Award at Summer School on Biometric Authentication: Multimodality and System Integration, Italy, June 2005.

Names: Mayank Vatsa and Richa Singh
Research: Enhancing Accuracy and Security of Multi-biometric Template using RDWT Watermarking
Accomplishment: Best Paper Award at Summer School on Biometric Authentication: Multimodality and System Integration, Italy, June 2005.

Name: Brian Powell
Fellowship: West Virginia University Foundation Distinguished Doctoral Fellowship Award
Accomplishment: Only one awarded for all Engineering and Science students

Undergraduate Students Advised and their Accomplishments

- Names:** Jacob Steele
Project: Honors College Summer Undergraduate Research Experience, 2011
Accomplishment: Discrete Wavelet Transform based Watermarking for Cameras
 Developed a FPGA Prototype
- Names:** Angelini, Castanos, Nicklow, Meshlum and Haun
Project: Flight Control Simulator
Accomplishment: First Place Award, Senior Design Fair, 1995
- Name:** Michael Sabolish
Project: Design of a Software Metrics Framework
Accomplishment: EG&G Research Scholarship (1 out of 8 Awards), 1995
- Names:** Don Reynolds, Suhail Nasser and Russ Williams
Project: Automatic Telephone Dialer
Accomplishment: First Place Award, Senior Design Fair, 1991
- Names:** Mike Heck, Andrew Kaicik and Russ Nix
Project: Robot Follower
Accomplishment: First Place Award, Senior Design Fair, 1990

Chairman of PhD Student Committees

D. Yadav	PhD CS	On Matching Faces with Temporal Variations using Representation Learning	May 2019
N. Kohli	PhD CS	Automatic Kinship Verification in Unconstrained Faces using Deep Learning	May 2019
B. Powell	PhD CS	Design of Face Detection CAPTCHAs Humans and Computers for Secure Authentication	May 2018
M. Vatsa	PhD CS	Quality Induced Multi-classifier Fingerprint Verification using Extended Feature Set	Dec 2008
R. Singh	PhD CS	Reducing the Effect of Covariates in Face Recognition	Dec 2008
L. Tian	PhD CS	Dynamic Learning with Neural Networks and Support Vector Machines	Aug 2005
P. Cross	PhD CpE	Fuzzy Reliability Modeling of Distributed Client Server Systems	Aug 1998
A. Pyzdrowski	PhD EE	Dedicated Hardware Structures for Linear Filters and Controllers	Dec 1990

Chairman of MS Student Committees

N. Kohli	MS CS	On Generative Adversarial Network Based Synthetic Iris Presentation Attack & its Detection	May 2019
D. Yadav	MS CS	Textured Contact Lens Based Iris Presentation Attack in Uncontrolled Environment	May 2019
N. Niasar	MS CS	Piece-wise Linear SVM to Classify Distributed Data	May 2015
E. Koshak	MS EE	Reconfigurable Universal Fuzzy Flip Flop	Aug 2012
J. Martin	MS CS	Coursework	Dec 2011
A. Day	MS EE	Designing a Face Detection CAPTCHA	May 2010
S. Moheuddin	MS CS	A Reconfigurable Distributed Multiagent System Optimized for Scalability	Aug 2010
J. Price	MS CS	Coursework	May 2010
Z. Ali	MS EE	FPGA Optimization of Barrel Shift Registers	May 2008
B. Powell	MS CS	Coursework	Dec 2006
V. Salla	MS EE	Error and Attack Tolerance of Complex Real Networks	Dec 2005
R. Singh	MS CS	Unconstrained Face Recognition for Law Enforcement Applications	Dec 2005
M. Vatsa	MS CS	Reducing False Rejection Rate in Iris Recognition by Quality Enhancement and Information Fusion	Dec 2005
S. Gangisetty	MS EE	Text Independent Speaker Recognition	May 2005
N. Tungala	MS EE	Contextual Biometric Watermarking of Fingerprint Images	Dec 2004
A. Rajogopalan	MS EE	ProSE: A Process Support Environment for Collaborative Independent Verification & Validation	May 1996
T. Montgomery	MS EE	Design, Implementation, and Verification of the Reliable Multicast Protocol	Dec 1994
P. Cross	MS EE	Microprocessor Chip Design in a Concurrent Engineering Environment	Aug 1993
S. Nestor	MS EE	Closed-Form Reliability Expression of Large Non-Homogeneous Distributed Systems	Aug 1993
B. Lu	MS EE	Detection of Transient Faults in Computers	Dec 1992
E. Strogon	MS EE	2D and 3D Transition Count Testing	Aug 1992
C. Wang	MS EE	Implementation of Matrix Operations with 3D Reconfigurable Array Structures using Field Programmable Gate Arrays	Jan 1992

G. Rahall	MS EE	Development of Software Tools for the Analysis of Faulty and Fault-free Iterated Polyfunctional Networks	Dec 1991
A. Rahil	MS EE	Built-in Current Testing of Transistor Stuck-open Faults of Static CMOS Complex Gates	Dec 1991
I. Ahmad	MS EE	A Software Tool to Determine the Exact Reliability of Complex Networks	Aug 1991
H. Nariman	MS EE	Availability Modeling of Fault-Tolerant Computer Systems	Aug 1991
J. Potter	MS EE	Design of Radiation Hardened CMOS Static RAM	Dec 1990

Workshop and Presentations on Teaching and Assessment

- Orientation for Graduate Teaching Assistants, Spring 2010 - present
Department of Computer Science & Electrical Engineering, West Virginia University
- Orientation for Graduate Teaching Assistants, Fall 2009 - present
Department of Computer Science & Electrical Engineering, West Virginia University
- Orientation for Graduate Teaching Assistants
Eberly College of Arts and Sciences, West Virginia University, August 1999
- Assessment in Higher Education
West Virginia Association of Academic Administrators, March 15, 1998
- Those Who Can, Teach: Outstanding Tips From Outstanding Teachers
West Virginia University Faculty Development Series, September 29, 1998
- Those Who Can, Teach: Outstanding Tips From Outstanding Teachers
West Virginia University Faculty Development Series, November 18, 1998
- Monitoring the Pulse of the Faculty: The Different Faces of Needs Assessment
Professional and Organizational Development Network Conference, October, 1995.
- Supporting Instructional Leadership within Colleges, Schools, and Departments
West Virginia University, Seventh Annual WVU Faculty Academy, May 8, 1995
- Instructional Improvement Network: Progress and Prospects
West Virginia University Faculty Development Series, April 11, 1995
- Critical Incidents in University Teaching
West Virginia University Faculty Development Series, February 28, 1995
- Developing an Instructional Improvement Network: Action Planning.
Sixth Annual West Virginia University Faculty Academy, May 9, 1994
- Developing an Instructional Improvement Network at West Virginia University
West Virginia University Faculty Development Series, April 19, 1994
- Business-Engineering Case Development Workshop
First National Conference on Business & Engineering Education, Auburn, April, 1994

Professional Development

- 2022 ABET Program Evaluator Training
Baltimore, May 16-17, 2022.
- 2021 ABET Workshop on Self-Study Report Development
Virtual Workshop, March 30, 2021
- High-impact Practices and Student Success
LEAP Texas 6th Annual Conference, Houston, Texas, March 2019.
- How to teach AI across K-12?
Computer Science Teachers Association Workshops, Phoenix, Arizona, July 2019.
- Electrical & Computer Engineering Department Heads Association (ECEDHA) Conference
March 18-22, 2016, La Jolla, CA.
- 2014 ABET Workshop, Institute for the Development of Excellence in Assessment
Leadership (IDEAL) - August 4-7, Baltimore, Maryland.
- 2012 ABET Symposium
April 19 - 21, Saint Louis, Missouri.
- Short course in Neural Network Applications in Image Processing
January 18, 2004, SPIE Symposium, California.
- Short course in Image Processing & Recognition using Neural Networks, Wavelets, and
Statistical Techniques, Jan 19, 2004, SPIE Symposium, California.
- Summer School on Biometrics: Authentication and Recognition
Alghero, Italy, June 2, 2003 to June 6, 2003.
- Short course in Cryptography and Digital Watermarking
Jan 2003, SPIE Electronic Imaging Science & Technology Symposium, CA.
- Short course in Advanced Image Processing
Jan 24, 2003, SPIE Electronic Imaging Science and Technology Symposium, CA.
- ABET Dean's Day Workshops - EAC and ASAC, Baltimore
July 1996, 1997, 2000, 2002, 2003.
- ABET Assessment Workshop, Pittsburgh
October 28, 2002.
- ABET 2000 Program Evaluator Training
San Jose CA, 1998.
- Xilinx University Professor Workshop, 1992
University of Pennsylvania, PA.
- ASEE Faculty Development Program on ASIC Design
Delco Electronics Corporation, IN, July 1991.
- Certificate of Achievement, Summer Workshop on VLSI Design
Massachusetts Microelectronics Center, MA, 1990.

Professional Affiliations

IEEE Member, Institute of Electrical and Electronics Engineers
Member of Computational Intelligence Society
Member of Consumer Electronics Society

RESEARCH

Research Areas

My research interests include computational intelligence in mathematical modeling and experimental validation covering areas such as information fusion, data analysis and decision making with uncertain, non-ideal or missing data, fault tolerance, image processing, pattern recognition, and machine learning. These approaches have been effectively applied in diverse applications such as biometrics for human recognition and homeland security, digital watermarking of multimedia objects for enhanced security, software failure prediction, predicting electric power loads, and reconfiguring critical infrastructures in the event of failures or attacks using distributed multi-agents.

Research Funding

I have received around \$5 million in external funded research as PI and Co-PI. I have been involved in team projects and individual projects funded by NSF, US Department of Energy, National Institute of Justice, NSF Center for Identification Technology Research, NASA, EPRI, National Consortium for Technology in Business-ASEE, DARPA, DoD Army Research Laboratory, and the FBI. I have collaborated with faculty colleagues from different colleges such as Business and Economics, Forensic Sciences, Arts and Sciences, and Human Resources and Education during proposal writing. The diversity in faculty collaboration has given the opportunity in developing and undertaking challenging interdisciplinary research projects. Selected outcomes of research have been integrated in classroom instruction to enhance the learning experience of students.

Research Awards

The outcomes of funded research projects have been disseminated in journals, conferences and book chapters. Ten papers received best paper and poster awards in international conferences. In addition, I was recognized as Outstanding Researcher three times in the college (one of 5 awards) and received the Researcher of the Year award given to one faculty out of 140 in the college of engineering.

Publications – Journal Papers

1. Agarwal, **A. Noore**, M. Vatsa, R. Singh, "Generalized Contact Lens Iris Presentation Attack Detection," *IEEE Trans. on Biometrics, Behavior, and Identity Science*, vol. 4, no. 3, pp 373-385, 2022.
2. Agarwal, R. Singh, M. Vatsa, **A. Noore**, "Boosting Face Presentation Attack Detection in Multi-Spectral Videos Through Score Fusion of Wavelet Partition Images," *Frontiers in Big Data*, vol. 5, pp 1-17, 2022.
3. Agarwal, **A. Noore**, M. Vatsa, R. Singh, "Enhanced Iris Presentation Attack Detection via Contraction-Expansion CNN," *Pattern Recognition Letters*, vol. 159, pp. 61-69, 2022.
4. Agarwal, R. Singh, M. Vatsa, and **A. Noore**, "MagNet: Detecting Digital Presentation Attacks on Face Recognition," *Frontiers in Artificial Intelligence*, vol. 4, 2021.
5. Malhotra, A. Sankaran, M. Vatsa, R. Singh, KB. Morris, **A. Noore**, "Understanding ACE-V Latent Fingerprint Examination Process via Eye-Gaze Analysis," *IEEE Trans. on Biometrics, Behavior, and Identity Science*, vol. 3, no. 1, pp. 44-58, 2021.
6. TI. Dhamecha, **A. Noore**, R. Singh, M. Vatsa, "Between-Subclass Piece-wise Linear Solutions in Large Scale Kernel SVM Learning," *Pattern Recognition*, vol. 95, pp 173-190, 2019.
7. N. Kohli, D. Yadav, M. Vatsa, R. Singh, **A. Noore**, "Supervised Mixed Norm Autoencoder for Kinship Verification in Unconstrained Videos", *IEEE Trans. on Image Processing*, vol. 28, no. 3. pp 1329 - 1341, 2018.
8. N. Kohli, M. Vatsa, R. Singh, **A. Noore**, A. Majumdar, "Hierarchical Representation Learning for Kinship Verification," *IEEE Trans. on Image Processing*, vol. 26, no. 1. pp 289-302, 2017.
9. S. Soleymani and **A. Noore**, "Dynamically Reconfigurable Evolutionary Multi-Context Robust Cellular Array Design," *Intl. Journal of Circuits and Architecture Design*, vol. 2, no. 1, pp 1-12, 2016.
10. N. Kohli, D. Yadav, and **A. Noore**. "Multiple Projective Dictionary Learning to Detect Plastic Surgery for Face Verification," *IEEE Access*, Vol.3, pp. 2572-2580, 2015.
11. S. Bharadwaj, H.S. Bhatt, R. Singh, M. Vatsa, **A. Noore**, "QFuse: Online Learning Framework for Adaptive Biometric System," *Pattern Recognition*, vol 48, no. 11, pp 3428-3439, 2015.
12. D. Yadav, R. Singh, M. Vatsa, **A. Noore**, Recognizing Age-Separated Face Images: Humans and Machines, *PLoS ONE*, vol. 9 no. 12, e112234, 2014.
13. Powell, G. Goswami, M. Vatsa, R. Singh and **A. Noore**, fgCAPTCHA: Genetically Optimized Face Images CAPTCHA, *IEEE Access*, vol. 2, pp. 473-484, 2014.
14. G. Goswami, B.M. Powell, M. Vatsa, R. Singh, and **A. Noore**, FR-CAPTCHA: CAPTCHA based on Recognizing Human Faces, *PLoS ONE*, vol. 9, no. 4, e91708, 2014.

15. G. Goswami, B.M. Powell, M. Vatsa, R. Singh, and **A. Noore**, FaceDCAPTCHA: Face Detection based Color Image CAPTCHA, *Future Generation Computer Systems - Special Issue on Human-Involved Computational Systems, Elsevier*, vol. 31, pp. 59-68, 2014.
16. M. Vatsa, R. Singh, **A. Noore**, and K. Morris, Simultaneous Latent Fingerprint Recognition, *Applied Soft Computing*, vol. 11, pp. 4260-4266, 2011.
17. B.M. Powell, A.C. Day, **A. Noore**, R.Singh, and M. Vatsa, Image-based Face Detection CAPTCHA for Improved Security, *International Journal of Multimedia Intelligence and Security* vol. 1, no. 3, pp. 269-284, 2010.
18. R. Singh, M. Vatsa, A. Ross, and **A. Noore**, Biometric Classifier Update using Online Learning: A Case Study in Near Infrared Face Verification, *Image and Vision Computing*, vol. 28, no. 7, pp. 1098-1105, 2010.
19. M. Vatsa, H.S. Bhatt, S. Bharadwaj, **A. Noore**, and S.S. Nooreyezdan, Plastic Surgery: A New Dimension to Face Recognition, *IEEE Trans. on Information Forensics and Security*, vol. 5, no. 3, pp. 441 - 448, 2010.
20. E. Koshak, **A. Noore** and R. Lovassy, Intelligent reconfigurable universal fuzzy flip-flop, *IEICE Electronics Express*, vol. 7, no. 15, pp.1119-1124, 2010.
21. M. Vatsa, R. Singh, **A. Noore**, and A. Ross, On the Dynamic Selection of Biometric Fusion Algorithms, *IEEE Trans. on Information Forensics and Security*, vol. 5, no. 3, pp. 470 - 479, 2010.
22. M. Vatsa, R. Singh, **A. Noore**, and S.K. Singh, Combining Pores and Ridge Features for Improved Fingerprint Verification, *Signal Processing*, vol. 89. pp. 2676-2685, 2009.
23. S. Moheuddin, **A. Noore**, and M.A. Choudhry, A Reconfigurable Distributed Multiagent System Optimized for Scalability, *International Journal of Computational Intelligence*, vol. 5, no. 1, pp. 60-71, 2009.
24. R. Singh, M. Vatsa, and **A. Noore**, Unification of Evidence Theoretic Fusion Algorithms: A Case Study in Level-2 and Level-3 Fingerprint Features, *IEEE Trans. on Systems, Man, and Cybernetics - A*, vol. 39, no. 1, pp. 47-56, 2009.
25. R. Singh, M. Vatsa, and **A. Noore**, Face Recognition with Disguise and Single Gallery Images, *Image and Vision Computing - Special issue on Multimodal Biometrics*, vol. 27, no. 3, pp. 245-257, 2009.
26. M. Vatsa, R. Singh, and **A. Noore**, Quality-Augmented Fusion of Level-2 and Level-3 Fingerprint Information using DS_m Theory, *International Journal of Approximate Reasoning*, vol. 50, no. 1, pp. 51-61, 2009.
27. M. Vatsa, R. Singh, and **A. Noore**, Feature Based RDWT Watermarking for Multimodal Biometric System, *Image and Vision Computing - Special issue on Multimodal Biometrics*, vol. 27, no. 3, pp. 293-304, 2009.
28. M. Vatsa, R. Singh, and **A. Noore**, Improving Iris Recognition Performance Using Segmentation, Quality Enhancement, Match Score Fusion, and Indexing, *IEEE Trans. on Systems, Man, and Cybernetics - B*, vol. 38, no. 4, pp. 1021-1035, 2008.
30. R. Singh, M. Vatsa, and **A. Noore**, Hierarchical Fusion of Multi Spectral Face Images for Improved Recognition Performance, *Information Fusion Journal*, vol.9, no. 2, pp. 200-210, 2008.

31. Z.A. Syed and **A. Noore**, Performance optimization to alleviate I/O constraints in designing large FPGA shifters, *IEICE Electronics Express*, vol. 5, no. 1, pp. 29-34, 2008.
32. R. Singh, M. Vatsa, and **A. Noore**, Integrated Multilevel Image Fusion and Match Score Fusion of Visible and Infrared Face Images for Robust Face Recognition, *Pattern Recognition - Special issue on Multimodal Biometrics*, vol. 41, no. 3, pp. 880-893, 2008.
33. R. Singh, M. Vatsa, A. Ross and **A. Noore**, A Mosaicing Scheme for Pose Invariant Face Recognition, *IEEE Trans. on Systems, Man, and Cybernetics - B, Special issue in Biometrics*, vol. 37, no.5, pp. 1212-1225, 2007.
34. R. Singh, M. Vatsa, and **A. Noore**, Improving Verification Accuracy by Synthesis of Locally Enhanced Biometric Images and Deformable Model, *Signal Processing Journal*, vol. 87, no. 11, pp. 2746-2764, 2007.
35. M. Vatsa, R. Singh, and **A. Noore**, Integrating Image Quality in 2-u SVM Biometric Match Score Fusion, *International Journal of Neural Systems*, vol. 17, no.5, pp. 343-351, 2007.
36. R. Morehead and **A. Noore**, Novel Hybrid Mitigation Strategy for Improving the Resiliency of Hierarchical Networks Subjected to Attacks, *Physica A: Statistical Mechanics and its Applications*, vol. 378, no. 2, pp. 603-612, 2007.
37. **A. Noore**, R. Singh, M. Vatsa, and M.M. Houck, Enhancing Security of Fingerprints through Contextual Biometric Watermarking, *Forensic Science International*, vol. 169, no. 2-3, pp. 188-194, 2007.
38. **Noore**, An improved SRAM cell design for tolerating radiation-induced single-event effects, *IEICE Electronics Express*, vol. 4, no. 3, pp. 100-105, 2007.
39. **Noore**, R. Singh, and M. Vatsa Robust Memory-Efficient Data Level Information Fusion of Multimodal Biometric Images, *Information Fusion Journal*, vol. 8, no. 4, pp. 337-346, 2007.
40. **Noore**, Improved IDDQ design-for-testability technique to detect CMOS stuck-open faults, *IEICE Electronics Express*, vol. 4, no. 3, pp. 94-99, 2007.
41. **Noore**, M. Vatsa, R. Singh, K. Morris, and M.M. Houck, Multiple Watermarking Enhances Security of Fingerprint Images, *Journal of Documents & Identity*, vol. 22, pp. 3-6, 2007.
42. R. Singh, M. Vatsa, **A. Noore**, and S.K. Singh, DS Theory based Fingerprint Classifier Fusion with Update Rule to Minimize Training Time, *IEICE Electronics Express*, vol. 3, no. 20, pp. 429-435, 2006.
43. **A. Noore**, Secure Distribution of Heterogeneous Multimedia Content on the Internet, *International Journal of Internet Protocol Technology*, vol. 1, no. 3, pp. 198-203, 2006.
44. M. Vatsa, R. Singh, **A. Noore**, M.M. Houck, and K. Morris Robust Biometric Image Watermarking for Fingerprint and Face Template Protection, *IEICE Electronics Express*, vol. 3, no. 3, pp. 1-6, 2006.
45. L. Tian and **A. Noore**, On-line prediction of software reliability using an evolutionary connectionist model, *Journal of Systems and Software*, vol. 77, no. 2, pp. 173-180, 2005.
46. L. Tian and **A. Noore**, Dynamic software reliability prediction: An approach based on Support Vector Machines, *Intl. Journal of Reliability, Quality and Safety Engineering*, vol. 12, no. 4, pp. 309-321, 2005.

47. M. Vatsa, R. Singh, and **A. Noore**, Improving biometric recognition accuracy and robustness using DWT and SVM watermarking, *IEICE Electronics Express*, vol. 2, no. 12, pp. 362-367, 2005.
48. R. Singh, M. Vatsa, and **A. Noore**, Textural Feature based Face Recognition for Single Training Images, *IEE Electronics Letters*, vol. 41, no. 11, pp. 640-641, 2005.
49. M. Vatsa, R. Singh, and **A. Noore**, Reducing the False Rejection Rate of Iris Recognition using Textural and Topological Features, *Intl. Journal of Signal Processing*, vol. 2, no. 1, pp. 66-72, 2005.
50. **A. Noore**, Reliable detection of CMOS stuck-open faults due to variable internal delays, *IEICE Electronics Express*, vol. 2, no. 8, pp.1-6, 2005.
51. L. Tian and **A. Noore**, Modeling distributed software defect removal effectiveness in the presence of code churn, *Mathematical and Computer Modelling*, vol. 41, pp. 379-389, 2005.
52. L. Tian and **A. Noore**, Evolutionary neural network modeling for software cumulative failure time prediction, *Reliability Engineering and System Safety*, vol. 87, no. 1, pp. 45-51, 2005.
53. **A. Noore** and P.L. Cross, Modeling the reliability of large dynamic distributed non-homogeneous networks, *Information Processing Letters*, vol. 93, no. 2, pp. 57-61, 2005.
54. **A. Noore**, An improved method to watermark images sensitive to blocking artifacts, *Intl. Journal of Signal Processing*, vol. 1, no. 2, pp. 129-134, 2004.
55. **A. Noore**, N. Tungala, and M.M. Houck, Embedding biometric identifiers in 2D barcodes for improved security, *Journal of Computers and Security*, vol. 23, no. 8, pp. 679-686, 2004.
56. L. Tian and **A. Noore**, A novel approach for short-term load forecasting using support vector machines, *International Journal of Neural Systems*, vol. 14, no.5, 2004.
57. L. Tian and **A. Noore**, Software reliability prediction using recurrent neural network with Bayesian regularization, *International Journal of Neural Systems*, vol. 14, no. 3, pp. 165-174, 2004.
58. **A. Noore**, Real Time Fault Tolerant Control of Robot Manipulators, *Mathematical and Computer Modelling*, vol. 38, no. 1-2, pp. 13-22, 2003.
59. **A. Noore**, Highly Robust Biometric Smart Card Design, *IEEE Trans. on Consumer Electronics*, vol. 46, no.4, pp. 1059-1063, 2000.
60. **A. Noore**, Fault Location in Multi-modular Redundant Systems, *Microelectronics and Reliability* vol. 37, no. 8, pp. 1267-1269, Aug 1997.
61. **A. Noore**, S. Nestor and M. Lawson, Computer-Based Multimedia Video Conferencing System, *IEEE Trans. on Consumer Electronics*, vol. 39, no.3, pp. 587-592, 1993.
62. **A. Noore**, The Effect on Yield and Chip-Area Utilization of Large Fault-Tolerant Processor Clusters, *Microelectronics and Reliability*, vol. 33, no. 3, pp. 403-412, 1993.
63. **A. Noore** and M. Lawson, Electronic Product Design and Manufacture in a Concurrent Engineering Environment, *IEEE Trans. on Consumer Electronics*, vol. 38, no.3, pp. 666-670, 1992.

64. **A. Noore**, W.L. Cooley and R.S. Nutter, Detecting and Masking Transient Failures in Computers Used for Coal Mining Operations, *IEEE Trans. on Industry Applications*, vol. 28, no.1, pp. 186-189, 1992.
65. **A. Noore**, S.K. Tewksbury and M. Divakurani, On Optimizing Yield, Reliability and Area Overhead in Large Memory Arrays, *Microelectronics and Reliability*, vol.32, no.1-2, pp. 67-78, 1992.
66. **A. Noore**, H. Nariman and M.A. Manzoul, Design of Reconfigurable Fault-Tolerant VLSI/WSI Processor Array Structures, *Microelectronics and Reliability*, vol. 31, no. 2-3, pp. 481-490, 1991.
67. **A. Noore**, Single Chip Decoder Design for Large Numeric Displays, *IEEE Trans. on Consumer Electronics*, vol. 37, no. 4, pp. 844-847, 1991.
68. **A. Noore**, Microcontroller Compatible Clock Chip Design Using Field Programmable Gate Array, *IEEE Trans. on Consumer Electronics*, vol. 37, no.3, pp. 629-634, 1991.
69. **A. Noore**, Simulation of VLSI Processing Deficiencies in Digital Integrated Circuits, *Mathematical and Computer Modeling*, vol. 14, pp. 354-359, 1990.
70. **A. Noore** and S. Nestor, Closed Form Reliability Expression of Large Non-Homogeneous Distributed Systems, *Mathematical and Computer Modeling*, vol. 14, pp. 196-200, 1990.
71. **A. Noore**, Testing CMOS Integrated Logic Circuits, *Intl. Journal of Science and Technology*, vol. 3, no. 2, pp. 17-20, 1990.
72. **A. Noore** and V.C.V.P. Reddy, Some Techniques for Testing of Digital Systems, *Institute of Electronics and Telecommunication Engineers Journal of Education*, vol. 22, no.2, pp.49-53, 1981.

Publications – Book Chapters

1. D. Yambay, A. Czajka, K. Bowyer, M. Vatsa, R. Singh, **A. Noore**, N. Kohli, D. Yadav, S. Schuckers, "Review of iris presentation attack detection competitions" *Handbook of Biometric Anti-Spoofing*, pp.169-183, 2019.
2. N. Kohli, D. Yadav, M. Vatsa, R. Singh, and **A. Noore**, Deep Face Representation Learning in Kinship Verification, in *Deep Learning in Biometrics* published by CRC Press - Taylor & Francis, 2018.
3. **A. Noore**, M. Vatsa, and R. Singh, Sensor level fusion, in *Encyclopedia of Biometric Recognition*, S. Z. Li (editor), pp. 616-621, 2009.
4. R. Singh, M. Vatsa, and **A. Noore**, Recognizing Face Images with Disguise Variations, in *Face Recognition*, M.S. Bartlett, K. Delac, and M. Grgic (Editors), ITECH Publishing, Chapter 11, pp. 149-160, 2008.
5. R. Singh, M. Vatsa, and **A. Noore**, SVM based adaptive biometric image enhancement using quality assessment, in *Speech, Audio, Image and Biomedical Signal Processing using Neural Networks*, B. Prasad and S.R.M. Prasanna (editors), Springer-Verlag Publishers, Chapter 16, pp. 351-372, 2008.
6. R. Singh, M. Vatsa, and **A. Noore**, Intelligent Biometric Information Fusion using Support Vector Machine, in *Soft Computing in Image Processing: Recent Advances*, M. Nachtgael,

- D. Van der Weken, E.E. Kerre, W. Philips (editors), Springer-Verlag, pp. Chapter 12, 325-349, 2007.
7. L. Tian, and **A. Noore**, Computational Intelligence Methods in Software Reliability Prediction, in *Computational Intelligence in Reliability Engineering*, G. Levitin (editor), Springer-Verlag Publishers, pp. 375-398, 2007.
 8. **A. Noore**, A. Pushkin, B. Morris, and M. Lawson, The 21st Century Incubator Project, in *Cross-Functional Management of Technology: Cases and Readings*, D. Aldridge and P. Swamidass (editors), pp. 183-208, 1996.

Publications – Conference Papers

1. A. Agarwal, N. Ratha, **A. Noore**, R. Singh and M. Vatsa, " Misclassifications of Contact Lens Iris PAD Algorithms: Is it Gender Bias or Environmental Conditions?," *IEEE Winter Conference on Applications of Computer Vision*, 2023 (accepted).
2. S. Ghosh, R. Singh, M. Vatsa and **A. Noore**, "RGB-D Face Recognition using Reconstruction based Shared Representation," *IEEE Intl. Conference on Automatic Face and Gesture Recognition*, 2021.
3. M. Singh, S. Nagpal, D. Yadav, N. Kohli, P. Pandey, G. Prabhakaran, R. Singh, M. Vatsa, **A. Noore**, J. Brefczynski-Lewis, H. Mahajan, "Understanding Neural Responses to Face Verification of Cross-Domain Representations," *2021 International Joint Conference on Neural Networks (IJCNN)*, 2021, pp. 1-8.
4. D. Yadav, N. Kohli, M. Vatsa, R. Singh and **A. Noore**, "Age Gap Reducer-GAN for Recognizing Age-Separated Faces," *Intl. Conference on Pattern Recognition (ICPR)*, 2021.
5. D. Yadav, N. Kohli, M. Vatsa, R. Singh, **A. Noore**, "Detecting Textured Contact Lens in Uncontrolled Environment Using DensePAD," *IEEE Conference on Computer Vision and Pattern Recognition Workshop*, 2019.
6. S. Nagpal, M. Singh, M. Vatsa, R. Singh, **A. Noore**, "Expression Classification in Children Using Mean Supervised Deep Boltzmann Machine," *IEEE Conference on Computer Vision and Pattern Recognition Workshop*, 2019.
7. M. Singh, S. Nagpal, R. Singh, M. Vatsa, **A. Noore**, "Learning A Shared Transform Model for Skull to Digital Face Image Matching," *In Proceedings of IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS)*, 2018.
8. D. Yadav, N. Kohli, E. Kalsy, M. Vatsa, R. Singh, **A. Noore**, "Unraveling Human Perception of Facial Aging using Eye Gaze," *CVPR Workshop on Analysis and Modeling of Faces and Gestures*, 2018.
9. D. Yadav, N. Kohli, A. Agarwal, M. Vatsa, R. Singh, and **A. Noore**, "Fusion of Handcrafted and Deep Learning Features for Large-scale Multiple Iris Presentation Attack Detection," *International Conference on CVPR Workshop on Biometrics*, 2018.
10. R. Keshari, M. Vatsa, R. Singh, and **A. Noore**, "Learning Structure and Strength of CNN Filters for Small Sample Size Training," *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018.

11. D. Yadav, N. Kohli, S. Yadav, M. Vatsa, R. Singh, **A. Noore**, "Iris Presentation Attack via Textured Contact Lens In Unconstrained Environment," IEEE Winter Conference on Applications of Computer Vision (WACV), 2018.
12. N. Kohli, D. Yadav, A. Noore, "Face verification with disguise variations via deep disguise recognizer," IEEE Conference on Computer Vision and Pattern Recognition Workshop, 2018.
13. M. Singh, S. Nagpal, R. Singh, M. Vatsa, **A. Noore**, "Learning A Shared Transform Model for Skull to Digital Face Image Matching," In Proceedings of IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2018.
14. D. Yadav, N. Kohli, E. Kalsy, M. Vatsa, R. Singh, **A. Noore**, "Unraveling Human Perception of Facial Aging using Eye Gaze," CVPR Workshop on Analysis and Modeling of Faces and Gestures, 2018.
15. D. Yadav, N. Kohli, A. Agarwal, M. Vatsa, R. Singh, and **A. Noore**, "Fusion of Handcrafted and Deep Learning Features for Large-scale Multiple Iris Presentation Attack Detection," International Conference on CVPR Workshop on Biometrics, 2018.
16. R. Keshari, M. Vatsa, R. Singh, and **A. Noore**, "Learning Structure and Strength of CNN Filters for Small Sample Size Training," Conference on Computer Vision and Pattern Recognition (CVPR), 2018.
17. D. Yadav, N. Kohli, S. Yadav, M. Vatsa, R. Singh, **A. Noore**, "Iris Presentation Attack via Textured Contact Lens In Unconstrained Environment," IEEE Winter Conference on Applications of Computer Vision (WACV), 2018.
18. S. Nagpal, M. Singh, A. Jain, R. Singh, M. Vatsa, and **A. Noore**, "On Matching Skulls to Digital Face Images: A Preliminary Approach", International Joint Conference on Biometrics (IJCB), 2017.
19. S. Nagpal, M. Singh, R. Singh, M. Vatsa, **A. Noore**, and A. Majumdar, "Face Sketch Matching via Coupled Deep Transform Learning", International Conference on Computer Vision (ICCV), 2017.
20. M. Singh, S. Nagpal, R. Singh, M. Vatsa, and **A. Noore**, "Gender and Ethnicity Classification of Iris Images using Deep Class Encoder", International Joint Conference on Biometrics (IJCB), 2017. **Received Best Paper Award.**
21. D. Yambay, B. Becker, N. Kohli, D. Yadav, A. Czajka, K. Bowyer, S. Schuckers, R. Singh, M. Vatsa, **A. Noore**, D. Gragnaniello , C. Sansone, L. Verdoliva, L. He, Y. Ru, H. Li, Z. Sun and T. Tan, "LivDet Iris 2017 - Iris Liveness Detection Competition", International Joint Conference on Biometrics (IJCB), 2017.
22. D. Yadav, N. Kohli, R. Singh, M. Vatsa, and **A. Noore**, "Unconstrained Visible Spectrum Textured Contact Lens Iris Database", International Joint Conference on Biometrics (IJCB), 2017.
23. A. Agarwal, M. Vatsa, R. Singh, and **A. Noore**, "SWAPPED! Digital Face Presentation Attack Detection via Weighted Local Magnitude Pattern", International Joint Conference on Biometrics (IJCB), 2017.
24. N. Kohli, D. Yadav, M. Vatsa R. Singh, and **A. Noore**, "Synthetic Iris Presentation Attack using iDCGAN", International Joint Conference on Biometrics (IJCB), 2017.
 - a. **Received Best Paper Award.**

25. A. Agarwal, D. Yadav, N. Kohli, R. Singh, M. Vatsa, and **A. Noore**, Face Presentation Attack with Latex Masks in Multispectral Videos, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshop*, 2017.
26. D. Yadav, N. Kohli, S. Nagpal, M. Singh, P. Pandey, M. Vatsa, R. Singh and **A. Noore**, "Region-specific fMRI Dictionary for Decoding Face Verification in Humans", *International Joint Conference on Neural Networks*, 2017.
27. B. Powell, E. Kalsy, G. Goswami, M. Vatsa, R. Singh and **A. Noore**, "Attack-Resistant aiCAPTCHA using a Negative Selection Artificial Immune System", *International Workshop on Bio-inspired Security, Trust, Assurance and Resilience*, 2017.
28. N. Kohli, D. Yadav, M. Vatsa, R. Singh, and **A. Noore**, "Detecting Medley of Iris Spoofing Attacks using DESIST", *Proc. IEEE International Conference on Biometrics: Theory, Applications and Systems*, pp. 1-6, 2016.
29. B.M. Powell, A. Gupta, J. Thapar, G. Goswami, R. Singh, M. Vatsa, and **A. Noore**, "A Multibiometrics-based CAPTCHA for Improved Online Security", *Proc. IEEE International Conference on Biometrics: Theory, Applications and Systems*, pp. 1-6, 2016.
30. D. Yadav, N. Kohli, P. Pandey, R. Singh, M. Vatsa, and A. Noore, "Effect of Illicit Drug Abuse on Face Recognition", *IEEE Winter Conference on Applications of Computer Vision*, 2016. **Received Best Paper Award.**
31. G. Goswami, R. Singh, M. Vatsa, B. Powell and **A. Noore**, Face Recognition CAPTCHA, *In Proc. IEEE International Conference on Biometrics: Theory, Applications and Systems*, pp. 412-417, 2012.
32. H.S. Bhatt, S. Bharadwaj, R. Singh, M. Vatsa, **A. Noore**, and A. Ross, On Co-training Online Biometric Classifiers, *Proc. IEEE International Joint Conference on Biometrics*, 2011, **Received the Best Poster Award.**
33. H.S. Bhatt, S. Bharadwaj, R. Singh M. Vatsa, and **A. Noore**, Evolutionary Granular Computing Approach for Recognizing Face Images Altered due to Plastic Surgery, *Proc. IEEE International Conference on Face and Gesture Recognition*, pp. 720-725, 2011.
34. M. Vatsa, R. Singh, A. Ross, and **A. Noore**, Quality-based Fusion for Multichannel Iris Recognition , *Proc. International Conference on Pattern Recognition*, pp. 1314-1317, 2010.
35. M. Vatsa, R. Singh, S. Bharadwaj, S.B. Himanshu, and **A. Noore**, Matching Digital and Scanned Face Images with Age Variation, *Proc. IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS '10)*, pp. 1-6, 2010.
36. M. Vatsa, R. Singh, and **A. Noore**, Context Switching Algorithm for Selective Multibiometric Fusion, *Proc. of Intl. Conference on Pattern Recognition and Machine Intelligence*, pp. 452-457, 2009.
37. M. Vatsa, R. Singh, and **A. Noore**, Context Switching Algorithm for Selective Multibiometric Fusion, *Proc. of Intl. Conference on Pattern Recognition and Machine Intelligence*, pp. 452-457, 2009.
38. Vatsa, R. Singh, and **A. Noore**, Fingerprint Indexing using Minutiae and Pore Features, *Proc. International Conference on Image Processing, Computer Vision and Pattern Recognition Conference*, pp. 870-875, 2009.

39. R. Singh, M. Vatsa, and **A. Noore**, Denoising and Segmentation of 3D Brain Images, *Workshop on Soft Computing in Image Processing and Computer Vision at Image Processing, Computer Vision and Pattern Recognition Conference*, pp. 561-567, 2009.
40. R. Singh, M. Vatsa, and **A. Noore**, Effect of Plastic Surgery on Face Recognition: A Preliminary Study, *Proc. IEEE Computer Society Workshop on Biometrics at Computer Vision and Pattern Recognition Conference*, pp. 72-77, 2009.
41. R. Singh, M. Vatsa, A. Ross, and **A. Noore**, Online learning in biometrics: A case study in face classifier update, *Proc. IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS '09)*, pp. 1-6, 2009. **Received Best Poster Award.**
42. R. Singh, M. Vatsa, **A. Noore**, and K. Morris, Simultaneous latent fingerprint recognition: A preliminary study, *Proc. IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS '09)*, pp. 1-6, 2009. **Received Best Paper Award.**
43. M. Vatsa, R. Singh, **A. Noore**, and S.K. Singh, Belief Function Theory based Biometric Match Score Fusion: Case Studies in Multi-Instance and Multi-Unit Iris Verification, *Proc. International Conference on Advances in Pattern Recognition*, pp. 433-436, 2009.
44. R. Singh, M. Vatsa, and **A. Noore**, Multimodal Medical Image Fusion using Redundant Discrete Wavelet Transform, *Proc. International Conference on Advances in Pattern Recognition*, pp. 232-235, 2009.
45. R. Singh, M. Vatsa, and **A. Noore**, Multiclass *mv*-Granular Soft Support Vector Machine: A Case Study in Dynamic Classifier Selection for Multispectral Face Recognition, *Proc. IEEE International Conference on Pattern Recognition*, pp. 1-4, 2008.
46. M. Vatsa, R. Singh, and **A. Noore**, Quality Induced Fingerprint Identification using Extended Feature Set, *Proc. IEEE Conference on Biometrics: Theory, Applications and Systems*, pp. 1-6, 2008.
47. M. Vatsa, R. Singh, A. Ross, and **A. Noore**, Likelihood Ratio in a SVM Framework: Fusing Linear and Non-Linear Classifiers, *Proc. IEEE Computer Society Workshop on Biometrics at Computer Vision and Pattern Recognition Conference*, pp. 1-6, 2008.
48. R. Singh, M. Vatsa, **A. Noore**, and S. K. Singh, Age Transformation for Improving Face Recognition Performance, *Proc. Second International Conference on Pattern Recognition and Machine Intelligence*, LNCS 4815, pp.576-583, 2007.
49. M. Vatsa, R. Singh, and **A. Noore**, Unification of Evidence Theoretic Fusion Algorithms: A case study in Level-2 and level-3 Fingerprint Features, *Proc. IEEE Conference on Biometrics: Theory, Applications and Systems*, 2007. **Received Best Paper Award.**
50. R. Singh, M. Vatsa, **A. Noore** and S. K. Singh, Dempster Shafer Theory based Classifier Fusion for Improved Fingerprint Verification Performance, *Computer Vision, Graphics and Image Processing Conference*, LNCS 4338, pp. 941-949, 2006.
51. R. Singh, M. Vatsa, A. Ross, and **A. Noore**, Performance Enhancement of 2D Face Recognition via Mosaicking, *Proc. Fourth IEEE Workshop on Automatic Identification Advanced Technologies (AUTOID)*, pp. 63-68, 2005. **Received Best Paper Award.**
52. R. Singh, M. Vatsa, and **A. Noore**, Recognition of Faces with Variations in Disguise, *Proc. Summer School on Biometric Authentication: Multimodality and System Integration*, Italy, June 2005. **Received Best Paper Award.**

53. M. Vatsa, R. Singh, and **A. Noore**, Enhancing Accuracy and Security of Multi-biometric Template using RDWT Watermarking, Proc. *Summer School on Biometric Authentication: Multimodality and System Integration*, Italy, June 2005. **Received Best Paper Award.**
54. M. Vatsa, R. Singh, P. Mitra and **A. Noore**, Comparing Robustness of Watermarking Algorithms on Biometrics Data, *Workshop on Biometric Challenges from Theory to Practice*, 2004.
55. M. Vatsa, R. Singh, P. Mitra and **A. Noore**, Signature Verification using Static and Dynamic Features, *International Conference on Neural and Information Processing*, LNCS vol. 3316, pp. 350-355, 2004.
56. M. Vatsa, R. Singh, P. Mitra and **A. Noore**, Digital Watermarking based Secure Multimodal Biometric System, *IEEE International Conference on Systems, Man and Cybernetics*, October 10-13, 2004, The Hague, Netherlands.
57. L. Tian and **A. Noore**, Short-term load forecasting using optimized neural network with genetic algorithm, *8th International Conference on Probabilistic Methods Applied to Power Systems*, Ames, IA, Sept. 2004.
58. L. Tian and **A. Noore**, Multistage Software Estimation, Proc. *IEEE Southeastern Symposium on System Theory*, Morgantown, WV, pp. 232-236, March 16-18, 2003.
59. **A. Noore**, A Secure Conditional Access System using Digital Signature and Encryption, Proc. *International Conference on Consumer Electronics*, pp. 220-221, June 17-19, 2003.
60. **A. Noore**, An Improved Digital Watermarking Technique for Protecting JPEG Images, Proc. *International Conference on Consumer Electronics*, pp. 222-223, June 17-19, 2003.
61. N.C. Tungala and **A. Noore**, Elimination of Visual Artifacts in Digital Image Watermarking, Proc. *IEEE Southeastern Symposium on System Theory*, Morgantown, WV, pp. 64-68, March 16-18, 2003.
62. A. Raman and **A. Noore**, Software Metrics for Real-Time Systems Using Fuzzy Sets, Proc. *IEEE Southeastern Symposium on System Theory*, Morgantown, WV, pp. 74-78, March 16-18, 2003.
63. L. Tian and **A. Noore**, Multistage Software Estimation, Proc. *IEEE Southeastern Symposium on System Theory*, Morgantown, WV, pp. 232-236, March 16-18, 2003.
64. **A. Noore**, S. Nestor and M. Lawson, Computer-Based Multimedia Video Conferencing System, *International. Conference on Consumer Electronics*, June 1993.
65. A.B. Pushkin, B.W. Morris, **A. Noore** and M. Lawson, Integrating a Multidisciplinary Project into the Accounting Curriculum *Proc. of the American Accounting Association* Mid-Atlantic Conference, pp. 34-39, April 1993.
66. **A. Noore**, P. Cross, and M. Lawson, Electronic Product Design and Manufacture in a Concurrent Engineering Environment, *International. Conference on Consumer Electronics*, June 1992.
67. **A. Noore**, Microcontroller Compatible Clock Chip Design Using Field Programmable Gate Array, *International Conference on Consumer Electronics*, June 5-7, 1991.
68. **A. Noore** and S. Cambam, Yield Analysis of 2D Hexagonal VLSI/WSI Arrays, *IEEE Southeastern Symposium on System Theory*, Columbia, SC, March 10-12, 1991.

69. **A. Noore** and R.S.Nutter, On Testing Iterated Neural Network Structures, *IEEE Southeastern Symposium on System Theory*, Columbia, SC, March 10-12, 1991.
70. **A. Noore**, W. L. Cooley and R. S Nutter, On detecting and masking transient failures in computers used for critical coal mining operations, 10th WVU *International Mining Electrotechnology Conference*, July 24-27, 1990.
71. **A. Noore** and H. Nariman, Fault Modeling and Reliable Design-for-Testability of CMOS Logic Circuits, *Modeling and Simulation Conference*, Pittsburgh, PA, May 3-4, 1990.
72. B. Weinrich and **A. Noore**, Modeling of Electric Fields Due to Arbitrary Dispersal of Charges in Space, *Modeling and Simulation Conference*, Pittsburgh, PA, May 3-4, 1990.
73. **A. Noore**, Fault-Tolerant Memory Design for Improved Yield and Reliability, Proc. of the *International Symposium on Circuits and Systems*, New Orleans, LA, May 1-3, 1990.
74. **A. Noore** and B. Weinrich, Strategies for Functional Testing of Microprocessors, Proc. of the *IEEE Southeastern Symposium on System Theory*, Cookeville, TN, March 11-13, 1990.
75. **A. Noore**, H. Ramasamy, J. Joseph, P. Klinkhachorn and S. N. Dwivedi, Distributed Processing for Real-Time Control of Robot Manipulators, Proc. of the 4th *International Conference on CAD/CAM, Robotics and Factories of the Future*, December 1989.
76. J. Joseph, S.K. Gupta, **A. Noore** and P. Klinkhachorn, A Neural Net Inference Cell for Rule-Based Expert Systems, Proc. of the 4th *International Conference on CAD/CAM, Robotics and Factories of the Future*, December 1989.
77. P. Klinkhachorn, R. Kothari, H. A. Huber, C. W. McMillin, J. Joseph and **A. Noore**, A Packing Algorithm as Applicable to Computer Aided Remanufacture of Lumber, Proc. of the 4th *International Conference on CAD/CAM, Robotics and Factories of the Future*, December 1989.
78. **A. Noore**, Memory Design to Improve Testability, Proc. of 32nd *Midwest Symposium on Circuits and Systems*, Urbana, IL, August 14-16, 1989.
79. **A. Noore**, Simulation of VLSI Processing Deficiencies in Digital Integrated Circuits, Proc. of *International Conference on Mathematical and Computer Modeling*, Chicago, IL, August 2-5, 1989.
80. **A. Noore** and S. Nestor, Closed Form Reliability Expression of Large Non-Homogeneous Distributed Systems, Proc. of *International Conference on Mathematical and Computer Modeling*, Chicago, IL, August 2-5, 1989.
81. **A. Noore**, R. S Nutter and R. E Swartwout, Creating a Test Knowledge Base for VLSI Testing, Proc. of *IEEE International Conference on Computer Design: VLSI in Computers*, Portchester, NY, Oct 5-8, 1987.

Research Grants Over \$5,000,000

- Creating a STEM Pipeline to Recruit, Retain and Prepare Minority Students for Today's Workforce (PI), Halliburton Foundation, Sept 01, 2021 to August, 31, 2022, \$10,000.
- Pathways to Promote Seamless Transitions for Undergraduate Engineering Majors (Co-PI), National Science Foundation, October 1, 2019 to September 30, 2024, \$2,392,470.

- Illumination-Invariant Iris Presentation Attack Detection (PI). Federal Bureau of Investigation (FBI), CJIS Division, April 1, 2019 to June 30, 2020, \$263,246.
- Detecting Multiple Iris Presentation Attacks (PI). Federal Bureau of Investigation (FBI), CJIS Division, May 1, 2017 to May 31, 2018, \$286,478.
- LivDet 2017: Liveness Detection Competition 2017 (PI). NSF-CITeR, January 1, 2017 to December 31, 2017, \$29,979.
- Evolutionary Approach to Adaptive Fusion: A Tool for Improving Multimodal Biometric Performance (PI). DoD US Army Research Laboratory, May 15, 2010 to December 31, 2012, \$467,800
- Improving Quality Enhanced Biometric Fusion Schemes. (Co-PI), PI - Bojan Cukic
NSF Center for Identification and Technology (CITeR), June 2008 to Nov 2009, \$55,000
- Integrated Control of Next Generation Power Systems. PI - Ali Feliachi
Software Agents for Monitoring and Control Task (PI)
US Department of Energy, October 2006 to Feb 28, 2010, \$ 56,925 (out of \$800,000)
- Friction Ridge Detail Study (PI)
U.S. Department of Justice, NIJ, Sept 19, 2005 to Sept 30, 2009, \$239,990
- Multiple Digital Watermarking of Fingerprint Images (PI)
U.S. Department of Justice, NIJ, Oct 01, 2003 to Sept 30, 2008, \$251,314
- NBSP Standards, Research, Education
National Biometric Security Project, Oct 01, 04 to Sept 30, 05, \$20,000 (out of \$461,699)
- DOE EPSCoR State Implementation Plan (Co-PI). Short Term Load Forecasting
U.S. Department of Energy, Oct 01, 2004 to Sept 30, 2005, \$43,063 (out of \$775,002)
- NBSP Standards, Research, Education
National Biometric Security Project, Oct 01, 03 to Aug 13, 04, \$43,804 (out of \$450,000)
- DOE EPSCoR State Implementation Plan (Co-PI), PI - Ali Feliachi.
Reliability and Failure Analysis of Power Systems
U.S. Department of Energy, EPSCoR, Jul 2003 to Oct 2004, \$43,739 (out of \$775,002)
- Validation Study of 3D Fingerprints PI
Limbic Systems, Research Corp, Jul 2003 to Jun 2004, \$37,000
- Validation of Limbic Systems Software (Co-PI), PI - George Trapp
Limbic Systems and WV Development Office, Nov 2002 to Dec 2003, \$199,999
- Advanced Power Engineering & Electricity Research Center
Program to Stimulate Interdisciplinary Research (CO-PI), PI - Ali Feliachi
West Virginia University Research Corp, Oct 2003 to Sept 2004, \$225,000
- GK-12 Teams of Interdisciplinary Graduate Fellows Engaged to Reinvigorate Students (TIGERS) about SMET - (Co-PI), PI - Fred King
NSF, Jan 2000 to Dec 2003, \$1,516,164
- Developing and Validating Metrics for Real-time Fault-Tolerant Software (PI)
NASA, Oct 2000 to Oct 2001, \$52,341

- NASA-WVU Educational Collaboration (Co-PI), PI- Ester Gottlieb
NASA, May 1997 to Apr 1998, \$147,000
- A Collaborative Concurrent Environment for Independent Verification and Validation (IV&V)
PI – Task 1.0, NASA, Nov 1994 to Nov 1995, \$39,450
- A Collaborative Concurrent Environment for Independent Verification and Validation
(IV&V), PI – Task 1.0, NASA, Nov 1993 to Nov 1994, \$82,074
- A Collaborative Concurrent Environment for Independent Verification and Validation
(IV&V), PI – Task 1.0, NASA, Nov 1992 to Nov 1993, \$69,021
- Collaborative Decision Making and Problem Solving in a Multidisciplinary Environment (PI)
National Consortium for Technology in Business, ASEE, and Auburn University
Nov 1992 to Nov 1994, \$57,033 (\$37,033 cost share)
- Design of Electronic Product in a Concurrent Engineering Environment (PI)
DARPA/Concurrent Engineering Research Center, WVU, Aug 1992 to Dec 1992, \$26,000
- Design of Electronic Product in a Concurrent Engineering Environment (PI)
DARPA/Concurrent Engineering Research Center, WVU, Aug 1991 to July 1992, \$34,000
- Using Field Programmable Gate Arrays in Senior Design Courses (PI)
NSF, MIPS Division CISE Directorate, Sept 1990 - May 1991, \$20,000
- Real Time Fault Tolerant Control of Robot Manipulators (PI)
GE Development Grant, Nov 1989 - Dec 1990, \$7,500
- Redundancy Management in Distributed Fault-Tolerant Computers for Coal Mining
Environment (PI), Electric Power Research Institute, Jan 1990 - Dec 1991, \$30,000
- Redundancy Management in Distributed Fault-Tolerant Computers for Coal Mining
Environment (PI), Energy and Water Research Center, WVU, Aug 89 - May 1991, \$30,000
- Rapid Prototyping for Semi Custom VLSI Design (PI)
DuPont Young Faculty Grant, Jul 1989 - Dec 1990, \$10,000
- Computer Aided Digital Logic Design (PI)
Westinghouse Education Grant, Aug 1987 – Aug 1988, \$10,000

SERVICE

National

ABET EAC Program Evaluator 2022 -
 Guest Editors (M. Vatsa, R. Singh, and Afzel Noore) *Journal of Information Fusion* 2018
 Special issue on *Deep Learning for Information Fusion*
 Guest Editors (S. Lian, G. L. Heileman, and A. Noore), *Intl. Journal of Soft Computing* 2009
 Special Issue on *Soft Computing for Digital Information Forensics*

Editorial Board of Intl Journal of Multimedia Intelligence and Security	2009 - 17
Editorial Board, Recent Patents on Engineering Journal	2007 - 15
Associate Editor, Intl Journal of Advanced Pervasive & Ubiquitous Computing	2012 - 13
Editorial Board, Open Nanoscience Journal	2007 - 14
Founding Editor, IEEE Consumer Electronics Newsletter	1993 - 94
Program Committee, IEEE Intl. Conf, Recent Trends in Image Processing & Pat Recog	2022
Program Committee, IEEE Intl. Conf Biometrics, Theory, Appl & Systems (BTAS)	2016
Program Committee, IEEE Intl. Conf Biometrics, Theory, Appl & Systems (BTAS)	2015
Program Committee, IAPR International Conference on Biometrics (ICB)	2015
Program Committee, IEEE/IAPR International Conference on Biometrics (ICB)	2014
Program Committee, IEEE Intl Symposium on Biometrics & Security Technologies	2014
Program Committee, IEEE/IAPR International Conference on Biometrics	2013
Program Committee, IEEE Intl. Conf Biometrics, Theory, Appl & Systems (BTAS)	2013
Program Committee, IEEE Intl. Conf Biometrics, Theory, Appl & Systems (BTAS)	2012
Reviewer, Multimedia Systems	
Reviewer, BTAS, CIBEC, ICB, IJCB	
Reviewer, IEEE Transactions on Information Forensics & Security	
Reviewer, Pattern Recognition	
Reviewer, IEEE Transactions on Pattern Analysis and Machine Intelligence	
Reviewer, Optics Express	
Reviewer, Journal of Information Fusion	
Reviewer, IEE Electronics Letters	
Reviewer, International Journal of Imaging Systems and Technology	
Reviewer, Journal of Information Sciences	
Reviewer, Journal of Reliability Engineering and Systems Safety	
Reviewer, International Journal of Electric Power and Energy Systems	
Reviewer, Optics Letters	
Reviewer, IEEE Transactions on Systems, Man and Cybernetics	
Reviewer, Journal of Zhejiang University of Science	
Reviewer, Probabilistic Methods Applied to Power System Conference	
US VISIT Program, Testing new Biometric Passports	2004
Organizing Committee, Southeastern Symposium on System Theory	2003
Chairman, Technical Session at Southeastern Symposium on System Theory	2003
Reviewer, IEEE Press Book on Digital Video	1994
Ex-Officio Member, Admin. Committee, IEEE Consumer Electronics Society	1994
Member, Technical Program Comm., International Conf. on Consumer Electronics	1994
Co-Chair, Technical Session at the International Conf. on Consumer Electronics	1994
Member, Steering Committee, 12th WVU Intl. Mining Electrotechnology Conf.	1994
Ex-Officio Member, Admin. Committee, IEEE Consumer Electronics Society	1993

Member, Technical Program Comm., International Conf. on Consumer Electronics	1993
Co-Chair, Emerging Technologies Session, Intl. Conf. on Consumer Electronics	1993
Reviewer, IEEE Computers	1992
Member, Steering Committee, 11th WVU Intl. Mining Electrotechnology Conf.	1992
Member, Technical Program Comm., International Conf. on Consumer Electronics	1992
Chairman, Technical Session at Southeastern Symposium on System Theory	1990
Member, Steering Committee of Southeastern Symposium on System Theory	1990
Member, Steering Committee, 10th WVU Intl. Mining Electrotechnology Conf.	1990
Reviewer, IEEE Transactions on Industry Applications	1987
Reviewer, IEEE Transactions on Circuits and Systems	1987

State

West Virginia Engineering Science and Technology Scholarship Committee	2000 - 2010
Chairman, IEEE Upper Monongahela Subsection	1990 - 1991
Secretary/Treasurer, IEEE Upper Monongahela Subsection	1989 - 1990
Delegate-at-Large, IEEE Upper Monongahela Subsection	1988 - 1989

University

Texas A&M University, Kingsville

Ruffalo Noel Levitz – TAMUK, Recruitment and Enrollment Working Group	2022 - present
President Task Force on Enrollment Management	2019 - 2020
President Task Force on Marketing and Communications	2019 - 2020
Program Committee, High-Impact Practices in Higher Education Conference	2020
Program Committee, High-Impact Practices in Higher Education Conference	2019
Chair, Undergraduate Program Review Subcommittee - Criminology	2020
Chair, Undergraduate Program Review Subcommittee - Physics	2019
Chair, Undergraduate Program Review Subcommittee - Geology	2019

West Virginia University

Phi Kappa Phi Honor Society, President	2015 - 2017
Heebink Award Committee	2017 - 2017
Phi Kappa Phi Honor Society, Secretary	2008 - 2014
Senate Research Integrity Committee	2012 - 2014
Heebink Award Committee	2011 - 2013
Bucklew and Foundation Scholars Selection Committee	2009 - 2011
West Virginia University Foundation Scholars Selection Committee	2007
Phi Kappa Phi, Executive Committee	2006 - 2017
Swiger Graduate Fellowship Selection Committee	2000 - 2007
Academic Integrity Committee	2005 - 2007
Affirmative Action Representative: Search for Program Coordinator at NRCCE	2004

Affirmative Action Rep: Search for Coordinator of the Africana Studies Program	2001
Co-chairman, WVU Student Employment Center Task Force	2000 - 2001
WVU Foundation Outstanding Teaching Award Selection Committee	1998 - 2000
Forensic Identification Admissions and Curriculum Committee	1999 - 2003
West Virginia University Faculty Class Advocate	1998 - 2002
West Virginia University Placement Exam Subcommittee	1998
West Virginia University Catalog Committee	1998
West Virginia University Strategic Enrollment Management Council	1998 - 2000
West Virginia University New Student Orientation Planning Committee	1997 - 1999
West Virginia University Retention and Advising Improvement Task Force	1996 - 1997
Board of Trustees Program Review Committee	1997
Co-coordinator, West Virginia University Instructional Improvement Network	1994 - 1997
Member, Academic Computing Advisory Committee	1995 - 2003
Faculty Development Workshop, 7th West Virginia University Faculty Academy	1995
West Virginia University – WVUIT Merger Task Force	1995
West Virginia University Foundation Scholars Selection Committee	1995 - 1996
Faculty Grants Committee for Instructional Technology and Improvement	1995 - 1999
Faculty Development Workshop, 6th West Virginia University Faculty Academy	1994
Advisor, West Virginia University Chess Club	1994 - 1998
WVU Faculty Development on Instructional Improvement Network	1994
WVU Foundation Outstanding Teaching Award Selection Committee	1990 - 1992

College

Texas A&M University, Kingsville

College Strategic Planning Committee, Undergraduate Studies	2022 - present
Undergraduate Academic Affairs Committee (Ex-Officio)	2018 - present
Resources Management Committee (Ex-Officio)	2018 - present

West Virginia University

College Undergraduate Academic Affairs Committee	2008 - 2017
ABET Leadership Committee	2007 - 2017
Outstanding Teachers Selection Committee	2012
Chairman, College Scholarship Committee	2006 - 2007
Outstanding Teachers Selection Committee	2005 - 2006
College Scholarship Committee	2003 - 2007
College Undergraduate Academic Affairs Committee (Ex-Officio)	1996 - 2003
College Academic Standards Committee (Ex-Officio)	1996 - 2003
College Scholarship Committee (Ex-Officio)	1996 - 2003
College Ad hoc ABET Readiness Committee (Ex-Officio)	2000 - 2003
Chairman, College Undergraduate Academic Affairs Committee	1994 - 1995
Committee on Collaboration between ECE & Computer Science Departments	1994 - 1995

College Undergraduate Academic Affairs Committee	1990 - 1993
College Academic Standards Committee	1987 - 1996
College Scholarship Committee	1993 - 1994

Department

Associate Department Chair for Academic Affairs	2009 - 2017
ABET Computer Engineering Planning and Self-Study Preparation	2014 - 2015
Chair, Computer Engineering Undergraduate Curriculum Committee	2009 - 2017
Chair, Computer Systems Graduate Curriculum Committee	2008 - 2017
Member, Graduate Program Committee	2009 - 2017
ABET Computer Engineering Planning and Self-Study Preparation	2008 - 2009
Coordinator, CS101 Course and Lab	2004 - 2008
Chairman, Scholarship Committee	2002 - 2007
ABET Computer Science Planning and Preparation	2005 - 2006
Member, Computer Engineering Curriculum Committee	2004 - 2007
Member, Faculty Search Committee	2007
Orientation, New Graduate Students	2005 - 2007
Recruiting, Freshman Engineering and High School Visitation	2004 - 2005
Chairman, Computer Engineering Curriculum Committee	1994 - 1995
Chairman, Department Academic Standards Committee	1991 - 1994
Chairman, Promotion and Tenure Committee for Assistant Professors	1992 - 1994
Chairman, Scholarship Committee	1993, 1994
Advisor for Transfer and Second Degree students	1993 - 1995
Advisor for University Exchange students	1993 - 1995
Advisor for Probation students	1987 - 1995
Faculty Advisor for Eta Kappa Nu	1994
Department Chairman Search Committee	1990
Faculty Advisor for Eta Kappa Nu	1988 - 1990
Outstanding Graduate Teaching Assistant Evaluation Committee	1990 - 1991
Department Academic Standards Committee	1988 - 1990
Coordinated Computer Engineering Freshman Student Orientation	1988 - 1990
Promotion and Tenure Criteria Task Force	1988
Coordinator, Electrical and Computer Engineering Graduate Handbook Task Force	1989