RESUME

SAJJAN G. SHIVA Ph.D.
185 Ivy Grove Ln.
Collierville, TN 38017
(901) 861-5499 (Home) (901) 678-5667 (Ofc)
sshiva@memphis.edu

PERSONAL

Citizen of U.S.A; Secret Clearance (inactive)

AREAS OF EXPERIENCE

Cyber security, Software Engineering, Cloud Computing,
Computer Architecture/ Distributed and Parallel Processing
Artificial Intelligence/ Expert Systems

EDUCATION

Ph.D. Electrical/ Computer Engineering, Auburn University, 1975.
M.E.E. Electrical/ Computer Engineering, Auburn University, 1971.
B.E. Electrical Engineering, Bangalore University, 1969.

AWARDS / CERTIFICATIONS/MEMBERSHIPS

Life FELLOW of IEEE (1993, for contributions to Computer Science and Engineering Education)
Life Member of ACM
American Society for Quality (ASQ) Certified Software Quality Engineer (CSQE)
IEEE Computer Society Certified Software Development Professional (CSDP)

EMPLOYMENT

2002 to Present: Computer Science Department, University of Memphis
Sept 2015 - : Professor
2005 – August 2015: Professor and Founding Chairman
2002 – 2005: Professor and Director, CS Division, Mathematical Sciences.

1999 to 2002: ISTC program, Teledyne Brown Engineering.
Manager- Software Quality Assurance
Member of the Software Engineering Process Group (SEPG)
Training Coordinator.

1998 to 1999: Intergraph Corporation
Senior Software Scientist
Executive Manager Technical (DARPA MariSTEP Program)

1978 to 2002: Teksearch Inc.
President

1978 to 1998: Computer Science Dept., University of Alabama in Huntsville

1998: Emeritus professor

1985 - 1998: Professor;
1982 - 1986: Dept. Chairman;
1978 - 1985: Tenured Associate Professor.

1996 to 1997: U.S. Army Space and Strategic Defense Command.
Technical Advisor (IPA), Computer Technologies Division,

1975 to 1978: Computer Science Technology Dept., Alabama A and M University
1975 - 1977 Assistant Professor
1977 - 1978 Associate Professor

1971 to 1974 Electrical Engineering Department, Auburn University
Graduate Teaching/ Research Assistant

Summer 91 Control and Guidance Directorate - U.S. Army MICOM
Electronic Engineer

PROFESSIONAL EXPERIENCE [ACADEMIC]:

UNIVERSITY OF MEMPHIS

Administration:

Transitioned the Computer Science program at UM from a Division in Mathematics Department to an independent Computer Science Department. The B.S., M.S. and Ph.D. programs became independent programs from being concentrations in Mathematics. Transitioned the M.S. program in E-commerce to the interdisciplinary Applied Computer Science Master's program, and the Bioinformatics concentration to the Bioinformatics Master's program at the College level. The B.S. program received the ABET/CAC accreditation. The department has 100 graduate and 250 undergraduate students. The number of faculty has doubled to 13 and research funding (NSF, NIH, DHS, ONR, DoD, etc.) has grown to the current award level of $8.5M+. The Department ranked 55th in the Nation in Federally Funded Research Expenditures. Also, established collaborations with local industry (FedEx, Smith and Nephew, ..).

Research:

Conducted research in: Game theoretic cyber security, cloud security, Agent-based software system design methodologies, Secure Software Development methods, Software Engineering Standards (CMMI, CMM, etc.) and Software Reuse.

Developed the System Testing Excellence Program (STEP), a collaborative effort between CS, MIS and EECE departments with the sponsorship of FedEx and other industry partners. STEP involves 13 researchers and has conducted seven annual international workshops on system testing (of which I serve as the General Chair).

Grants:

Principal Investigator: Game Theoretic Approaches to Protect Cyberspace, ONR grant N00014-09-1-0752, April 2009 – April, 2010, $251K.

Principal Investigator: State Online Cybersecurity Training, State of Alaska, October 2009 – October 2010, $150K.

Co-Principal Investigator, SUN Sparc Server Equipment grant, SUN Microsystems, August 2009, $25,000.

Co-Principal Investigator: Computer Science Resources for Memphis Area High Schools, NSF GK-12 grant, 2004- 2007, $1.6M. Supported about 56 high school Computer Science teachers, enhancing their teaching skills and resources.

Subject Matter Consultant: ACT online, Dept. of Homeland Security grant, 2006-2009, $4M. Developed instructional modules for online courses on Computer Security under this collaborative effort between UM, Vanderbilt University and Sparta Corporation.

Teaching:

Developed and taught Computer Architecture (UG) and Advanced Topics in Software Development (G) courses. Currently guiding five Ph.D. students.

Service:

In addition to the usual university committee activities, served as the invited Chair of the Educational Testing Service (ETS) committee to reformulate the CS Major Field Test, and as a Program Evaluator for ABET/CAC, Serving as an alternate ABET Commissioner, Invited member of the Tennessee Governor's Trade and Education Delegation to China, Facilitated faculty/student exchange agreement between UM and several universities in India and China.

UNIVERSITY OF ALABAMA IN HUNTSVILLE

Administration:

Developed Computer Science B.S. and Ph.D. degree program proposals as a team member. As the first Chairman of the full-fledged department, I implemented these degree programs, to augment the existing M.S. program. The first group of students with B.S. and Ph.D. degrees graduated during my tenure as Chairman. The number of faculty in the department grew from 7 to 14 in spite of the shortage of qualified CS faculty candidates. The student enrollment in the department grew to 250 graduate majors, 300 undergraduate majors and 300 non-majors, making this the largest CS department in Alabama.

In addition to establishing hardware and software laboratories to support the instructional activities, I was instrumental in the establishment of the Artificial Intelligence Learning Center through the support of Symbolics Inc. and in cooperation with UAH's Johnson Research Center.

To support the AI research in the department, a Knowledge Technology laboratory was also established with the support from Texas Instruments Inc. and in cooperation with Johnson Research Center.

Research*:*

Conducted research on Hardware Description Languages (HDL), AI-based automatic hardware synthesis and software engineering under grants from NASA, U.S. Army Missile Command, ARO, NATO and Strategic Defense Command. This activity has resulted in:
(a) the enhancement of NASA's CADAT LSI Design System to include a hardware synthesis module that translates the high-level language description of the target system into a netlist structure,
(b) development of an expert system for hardware synthesis starting from a VHDL description of the target system,
(c) invitation to serve on the committee that developed U.S. Army Strategic Defense Command's Architecture Description Language (ADL) for multiprocessor system description,
(d) invitation to serve on the Department of Defense's committee for the development of very High Speed Integrated Circuit (VHSIC) Hardware Description Language (VHDL),

(e) development of a CASE tool integration methodology to suit the Software Engineering activities of U. S. Army Missile Command,
(f) development of an expert environment for software reuse,
(g) invitation to lecture on AI applications to automatic synthesis, by Council of Scientific and Industrial Research, India, and
(h) invitation to write journal articles and a chapter in a book on Expert System Applications.

Teaching:

Developed and taught undergraduate, graduate and continuing education courses in Computer Architecture, Parallel Processing, Distributed Processing, Computer Networks, Logic Design, Programming Languages and Data Structures. In particular, developed a sequence of courses in Computer Architecture starting with a junior level Logic Design course and ending with a graduate level course in Parallel Processing. Authored a series of three books on Computer Architecture as a result of this activity.

Consulting:

Consulting activities with industry and government have spanned the areas of HDLs, performance evaluation of multiprocessor systems, embedded systems, signal processing architectures, software engineering methodologies and virtual reality applications.

Service:

In addition to the regular university service on various committees, I have served as the Chairman of the IEEE Computer Society (Region 3) during 1986-88 and as a Program Evaluation Team Chair for the Computer Sciences Accreditation Board (CSAB) during 1993-1996.

Contracts and Grants:

Principal Investigator: "Software Engineering Environment Specification", US Army MICOM, Software Engineering Directorate, July - Sept 1990. Developed a CASE tool integration methodology to suit the PDSS activities of MICOM - SED.

Co-Principal Investigator: "Automated Data Processor and Network Architecture Design Tool Enhancement," Strategic Defense Command, May 1985 - May 1988. Enhancement of Architectural Description Language (ADL) structure to make it suitable for hardware descriptions and interface to other HDLs and silicon compilers.

Principal Investigator: "Expert System for Hardware Synthesis," U. S. ARO Short-Term Innovative Research Grant, DAAG29-84-K-0114, July - August 1984. Developed a prototype expert system that can select the appropriate VHSIC modules to build a hardware system, from a knowledge base. The knowledge representation scheme has been now expanded to be called a Hologram. Research work is continuing to expand the prototype system to perform general hardware synthesis.

Principal Investigator: "Automatic Design of Digital Systems," NASA Contract NAS8-33096, September 1978 - January 1983.

Principal Investigator: "Hardware Description Languages," NATO Grant 020-81, June 1981 - May 1982. Developed automatic hardware synthesis procedures that selected required standard cells from a library to implement a hardware system described in DDL. The DDL system was integrated into CADAT LSI design system of NASA and it provides the capability to describe and simulate the hardware at register transfer level and generates net-lists suitable for CADAT system.

ALABAMA A&M UNIVERSITY,

***Research**:*

(a)Conducted research in the area of Computer Aided Design (CAD) of digital filters under an NSF grant. The CAD tools developed as a result of this activity, allow the implementation of a high order digital filter as either a cascade or a parallel interconnection of second order modules (i.e. DSP structures).

(b) Initiated research on HDLs and automatic synthesis under a NASA grant. This research resulted in the first comprehensive comparison of about 45 HDLs then proposed and an HDL selection methodology.

Teaching:

(a)Developed and taught graduate courses in computer architecture, programming languages, architecture of assemblers, and information retrieval; undergraduate courses on introduction to CS, FORTRAN, COBOL, PL/1 and assembly languages, systems design, logic design and computer architecture.

(b)Developed the course and operation structure for the newly approved Master's program in Computer Science.

(c)As the program coordinator, revised the undergraduate curriculum to satisfy the ACM guidelines.

(d)Proposed, developed and taught a course on computer awareness for high school teachers, under an NSF grant. (First such course in the State of Alabama.)

Service:

Served as an executive committee member of the IEEE Computer Society, Huntsville Chapter and as campus activity coordinator for ASEE.

Contracts and Grants:

Principal Investigator: "Evaluation of Digital System Design Languages," NASA Grant NSG-8057, October 1977 - September 1978. Conducted a survey and comparison of HDLs to select an appropriate language to be interfaced to NASA's Computer Aided Design and Test (CADAT) system.

Project Director: "An Awareness of Computer Applications in Society - Project for Secondary School Teachers," National Science Foundation Project SMI 77-14716, January 1978 - September 1978. Organized and taught a course on computer awareness for selected secondary school teachers.

Principal Investigator: "Structure Selection for Second-Order Digital Filters," National Science Foundation Grant SER-76-08662, June 1976 - December 1977. Developed procedures to select a hardware structure that minimizes the quantization effects in the implementation of digital filter transfer functions.

AUBURN UNIVERSITY:

(a)Taught courses on logic design, FORTRAN and BASIC languages and computer organization.

(b)Performed research in computer-aided logic design, multivalued logic and digital filters. Developed a computer aided design package for automatic design of combinational and sequential circuits, in FORTRAN on an IBM 360.

Developed a software package to design higher order digital filters starting from the transfer function specification, in FORTRAN on IBM 360.

PROFESSIONAL EXPERIENCE [INDUSTRY / GOVERNMENT]

TEKSEARCH INCORPORATED [1978 – 2002]
As founder and President of the technology consulting company, I have been involved in all aspects of marketing, proposal writing, bid preparation and managing of about 40 small contracts and grants from industry and DoD. In particular, established the capability to customize, test and supply MILSPEC electronic components to U.S. Department of Defense.

TELEDYNE BROWN ENGINEERING [November 1999 to 2002]
Manager- Software Quality Assurance and Member of the Software Engineering Process Group (SEPG) core team, to improve the software development activities at the ISTC program to attain Software Capability Maturity Model (SW-CMM) level 3. Work includes the formulation and improvement of processes in the areas of project planning, project tracking and oversight and intergroup coordination. Pragma System Corporation's processMax tool is being used.

As the Training Coordinator, developed the ISTC Training Plan to accommodate SW-CMM , ISO and ISTC-specific training requirements. Chairing the Training Group and developing, teaching and coordinating courses.

INTERGRAPH CORPORATION [June 1998 to October 1999]

Supported Product Data Modeling activities in SIR, AIM and GSCAD environments; Use Case development; Requirement collection methodologies; Conducted studies on Configuration Management techniques, Revisioning /Versioning, PDM methodologies, UML, EXPRESS-G and STEP. Used Rational ROSE and RequisitePro.

As the Executive Manager of the DARPA MARITECH program, managed the consortium consisting of ship builders and CAD tool developers, to develop software environments for exchange of ship modeling data. Developed schedules, managed the budget, handled subcontractors and deliverables.

ADTRAN Inc. [Consultant]
Development of the software Agent (Server) to manage the EOC (Embedded Operations Channel) and TMC (Time management Channel) functions of a Telecom Remote Digital Terminal (RDT). The Agent coordinates the Managed Objects (MO) and interfaces to the Manager (Client) through the OSI stack and utilizes CMISE and ROSE protocols.

U. S. ARMY STRATEGIC DEFENSE COMMAND [Technical Advisor]
Supported the Object Management Working Group (OMWG) in the development of C2 Schema for representing various objects for Joint Task Force Advanced Technology Demonstration (JTFATD). Developed a computer technology taxonomy in support of the Information Technology IPT, in an effort to determine new technology thrust areas.
Evaluated proposals in the areas of embedded computer systems architecture, signal/ image processing computer architectures, innovative decision aids (utilizing Artificial Intelligence, Neural nets, fuzzy logic) for applications such as sensor fusion, planning and resource allocation, and software engineering.

HOLEMAN SCIENTIFIC CORPORATION [Consultant, 1994]:
Performance evaluation of embedded single and multiple processor systems utilized in various weapon systems (MLRS, BAT, etc.).
Evaluation of control algorithms for BAT and corresponding ASIC (Application Specific Integrated Circuit) implementations.

QUALITY RESEARCH INC. [Consultant, 1996]:
Software Testing Methods. Developed and taught a course on Software Testing Methodologies , for NASA-MSFC .

U. S. ARMY TMDE ACTIVITY [Summer Faculty Fellow, 1993]:
Embedded Test and Diagnostics Methodologies - Development of testable design methodologies for VLSI circuits. Evaluation of CAD software systems.

SCIENCE AND TECHNOLOGY INC. [Consultant, 1995]:
Conducted a state-of-the-art survey of virtual reality systems to suggest a suitable system for MICOM visualization and training applications.

OPTIMIZATION TECHNOLOGY INC. [Consultant, 1993]:
Developed models for process communication in various multiprocessor paradigms. These models were utilized in creating benchmarks for multiprocessor system performance evaluation.

SOFTWARE ENGINEERING DIRECTORATE- U.S. ARMY MICOM [Summer Faculty Fellow, 1989]:
Software maintenance methodologies for weapon system software, DoD-STD-2167, cost modeling using COCOMO and SECOMO, Functional modeling using NETWORK II.5, Development of initial configuration for a CASE environment for SED's PDSS activities.

NASA - MARSHALL SPACE FLIGHT CENTER [Summer Faculty Fellow 1991, 1990]:
Expert Systems - Modified the Nickel-Cadmium battery diagnostics expert system to accommodate Nickel-Hydrogen batteries. The expert system is written in C and Prolog.

NICHOLS RESEARCH CORPORATION [Consultant, 1987]:
Evaluation of Army Tactical Missile System (TACMS) and Advanced Anti-Tank Weapon System- Medium (AAWS-M) through NETWORK II.5 modeling and System Evaluation Benchmarks developed in Ada.

COLSA INC. [Consultant, 1982 - 1988]:
Review of the Signal Processing Electronics (SPE) architecture of MLRS- TGW system. The SPE is a multiprocessor system based on Motorola 68000 and uses 11 Digital Signal Processors (DSP) configured around a single bus, developed by DIEHL Inc. The review suggested possible alternate architectures and components to obtain the performance requirements.

Review of computer performance measures as applied to AN/TSQ-73 and the analysis of AN/TSQ-73 performance enhancement due to the memory system update from a core to CMOS technology.

Feasibility analysis to apply a state-of-the-art processor to AN/TSQ-73 system with emphasis on the candidate processors considered for SHORAD C2 system. This work involved the development of benchmarks and questionnaires to aid the SHORAD C2 source selection.

Assessment of AN/TSQ-73 system to provide the supporting analysis for the development of Joint Tactical Distribution System (JTIDS)/ Single Channel Encryption (SCE) design requirements, tests and evaluation document. This work included the preliminary modeling and simulation of AN/TSQ-73 subsystems using NETWORK II.5.

INTERGRAPH CORPORATION [Consultant, 1980]:
Evaluation of the JOVIAL compiler - The JOVIAL compiler documentation was analyzed to see the correspondence between the code and the documentation to determine if the documentation facilitates easy maintenance of the compiler. Typical error scenarios were used in verifying the documentation completeness.
Development of display subsystem specification for FAAD/C2 system. The display requirements of various devices of the weapon system were analyzed to determine the software size and speed requirements. The result of this analysis provided the basis for an initial determination of code size and throughput needed.

ESPEE INC. [consultant, 1980]:
Analysis of the BMD C3 multiprocessing system requirements to derive distributed processing operating system requirements.

GENERAL RESEARCH CORPORATION [Consultant, 1978]:
Review of hardware description languages and their simulation capabilities for multiprocessor systems.

U. S. ARMY STRATEGIC DEFENSE COMMAND [Consultant, 1979]:
Development of an Architecture Description Language for describing distributed processing systems.

DEPARTMENT OF DEFENSE [Consultant, 1983]:
Member of the team that developed the requirements and the structure of VHSIC-Hardware Description language (VHDL).

CONTROL AND GUIDANCE DIRECTORATE - U.S. ARMY MICOM [Electrical Engineer, 1971]:
Developed file transfer system software for Raytheon 520 computer system, in assembly language and Fortran.

COURSES TAUGHT

COMP 3410 Computer Organization and Assembly Language
COMP 7087/8087 Advanced Topics in Software Engineering
CS714 Parallel Processing Architectures
CS713 Distributed Processing Systems
CS670 Computer Networks
CS613 Computer Architectures
CS586 Microprocessor Architecture
CS517 Data Organization and Algorithm Analysis

CS513	Introduction to Computer Architecture
CS413	Introduction to Digital Computer Design
CS309	Switching Theory
CS308	Computer Organization and Assembly Language Programming
CS214	Introduction to Discrete Structures
CS113	Problem Solving using FORTRAN
CS107	Computer Science I with C
CMP510	Operating Systems
CMP501	Computer Architecture
CMP610	Information Storage and Retrieval
CMP486	Computer Organization
CMP476	Data Structures
CMP412	Architecture of Assemblers
CMP401	System Design
CMP205	FORTRAN Programming
CMP202	Assembly Language Programming
CMP200	COBOL Programming
CMP101	Introduction to Data Processing
EE422	Computer Organization
EE412	Sequential Logic Design
EE312	Combinational Logic Design
EE103	BASIC and FORTRAN Programming

Continuing Education Courses:

Pascal Programming	Capability Maturity Model (CMM)
C Programming	ProcessMax for Software Process
FORTRAN Programming	Improvement
Computer Fundamentals	Unified Modeling language (UML)
Minicomputers	Requirements Management through
Microcomputer System Design	Use cases
Computer Architectures	Team Development
Ada	Software Security Testing

Ph. D. Dissertation Guidance

- Currently Guiding 4 Doctoral students.

"Runtime Monitoring Technique to Detect and Prevent SQL Injection Attacks" Ramya Dharam, August 2014.
"AVOIDIT IRS:An Issue Resolution System to Resolve Cyber Attacks" Christopher Simmons, August 2014.
"Mitigating Congestion-based Denial of Service Attacks" Harkeerath Bedi, December 2013.
"Non-invasive knowledge capture in software engineering "Sara Lee, May 2011.
"Datamining algorithms for customer churn prediction", Mathew Anwanyu, August 2010 .
"Distributed Programming and Resource Balancing in Networked Systems", P. Ledru, 2001.
"Interfacing Knowledge-based Systems to Simulation Systems", E. Gorman, 2001.
"Software Reuse Expert Environment (SREE)", P. Wang, 1994.
"Construction of Dynamic Stochastic Simulation Models Using Knowledge-Based

Techniques", M. Douglas Williams, 1990.
"Representation and Matching of Knowledge for the Design of Digital Systems", Judit Jones, 1989.
"Cellular Automata and Their Behavior Under Micro-Dataflow Regimes", D. Ross Grable, 1989.
"An Aposteriori Computer Security System to Identify Computer Viruses", Robert McKosky, 1989.
"On Interfacing HDL to Knowledge-bases," P. Klon, 1986.
"Development of An Expert Hardware Synthesis System," C. R. Green, 1984.

Master's Thesis Guidance
"Role definition for User Provisioning", Reluca Stoin, December 2008.
"Distributed Programming in Ada with Protected Objects", P. Ledru, 1995.
"Energy System - An Extension to A Visual Simulation System", R. Rampur, 1995.
"Analysis of the ATM Leaky Bucket Policing System", V. Rao, 1995.
"An Object Oriented Graphical User Interface to an Expert System for Testable Circuit Design", Chaya Rao, 1994.
"An Expert System for Testable Circuit Design", R. Murthy, 1993.
"Implementation of Reliable and Efficient Remote Procedure Calls", R. Virmani, 1992.
"Synchronizing A Real-Time Clock Over A Heterogeneous Distributed Network", M. Jones, 1988.
"An Expert System to Aid in Proposal Management," D. Lowther, 1987.
"An Investigation of the Issues Involved in Man-Computer Interfaces," G. Sinclair, 1985.
"Logic Minimization Interface for DDL System,"C. Srinivas, 1983.
"Modular Hardware Synthesis," J. Covington, 1982.
"Automatic Hardware Synthesis from DDL Description," A. M. Shah, 1981.

Publications

BOOKS
Computer Organization, Design and Architecture, Fifth Edition, CRC Taylor and Francis, December 2013 (Fourth Edition, Taylor and Francis CRC Press, 2008; Third Edition, Marcel-Dekker, 2000; Second Edition, HarperCollins, 1991; First Edition, Little, Brown Publishers, Boston, Mass., 1985.)

Advanced Computer Architectures, Taylor-Francis CRC Press, 2006.

Introduction to Logic Design, (Second Edition), Marcel Dekker,1998 (First edition , Scott, Foresman/Little, Brown, 1988). Translated to Spanish in 2009.

Pipelined and Parallel Computer Architectures, HarperCollins/ Addison-Wesley, 1996.

CHAPTERS IN BOOKS
"Expert Systems for Automatic Hardware Synthesis," *in Expert Systems in Engineering Applications,* Springer-Verlag, 1993.

"Hardware Implementation," in *Systems Modeling and Computer Simulation*, Marcel-Dekker, 1995 (with M. Mohadjer) (Invited) (Second Edition) (First Edition, 1987).

"Multiple Processor Systems," in *Systems Modeling and Computer Simulation*, Marcel-Dekker, 1995 (Invited) (Second Edition) (First Edition, 1987).

DISSERTATION
"Implementation of Real-Time Digital Filters," Auburn University, 1975.

JOURNAL AND MAJOR CONFERENCE PAPERS

Z. Cao, C. Wu, S. Shiva, Y. Gu, On Modeling and Analysis of MIMO Wireless Mesh Networks with Triangular Overlay Topology, Mathematical Problems in Engineering, vol. 2015, Article ID 185262, 11 pages, 2015.

E. Aldhahri, V. Shandilya, S. Shiva, Towards an Effective Crowdsourcing Recommendation System, IEEE International Symposium on Software Crowdsourcing, 2015.

V. Shandilya, S. Shiva, A Network Security Game Model, ACM-CODASPY, March 2015.

Z. Cao, C. Wu, S. Shiva, Y. Gu, On Modeling and Analysis of MIMO Wireless Mesh Networks with Triangular Overlay Topology, Mathematical Problems in Engineering,
vol. 2015, Article ID 185262, 11 pages, 2015.

V. Shandilya, C. Simmons, S. Shiva, Use of Attack Graphs in Security Systems, in Journal of Computer Networks and Communications, *in press*

H. Bedi, S. Roy, S. Shiva, Mitigating congestion based DoS attacks with an enhanced AQM technique, in Journal of Computer Communications, Elsevier, Feb 2015, *vol. 56, pp. 60-73.*

V. Shandilya, F. Polash, S. Shiva, A Multi-Layer Architecture for Spam Detection, International Journal of Computer Science and Information Technology, 2014, vol. 6, Issue 4, pp. 193-200.

F. Sheldon, S. Shiva and Q. Chen, Testing an Autonomic Energy Security Management Framework for Cyber-Physical Systems, ITEA Test Technology Workshop, November 2014, Memphis, TN.

A. Abuhussein, H. Bedi, S. Shiva, Exploring Security and Privacy Risks of SoA Solutions Deployed on the Cloud, GCA 2014, Las Vegas, Nevada, USA, July 2014.

C. Simmons, S. Shiva, L. Simmons, ADAPT: A Qualitative Analysis of An Ontology Based Issue Resolution System for Cyber Attack Management, In Cyber Technology in Automation, Control and Intelligent Systems (CYBER), IEEE 4rd Annual International Conference , Hong Kong, China, June 2014.

R. Dharam, S. Shiva, Runtime Monitoring Framework for SQL Injection Attacks, International Journal of Engineering and Technology, vol. 6, no. 5, pp. 392-401, 2014.

V. Shandilya, F. Polash, S. Shiva, A Multi-Layer Architecture for Spam Detection, International Journal of Computer Science & Information Technology, Vol. 6 Issue 4, p193-200, 2014

H. Bedi, S. Shiva, Mitigating Congestion-Based Denial of Service Attacks with Active Queue Management, GLOBECOM 2013, Atlanta, GA, USA- Dec 2013.

S. Shiva, S. Ramesh, R. Dharam, A Survey of Testing Methodologies for Cloud-based applications, International workshop on research in Software Testing, Memphis, TN, USA, Oct 2013.

R. Dharam, S. Shiva, Testing Web Applications for Tautology based SQL Injection Attacks Using Runtime Monitors, International workshop on research in Software Testing, Memphis, TN, USA, Oct 2013.

V. Shandilya, S. Shiva., Security in the Cloud Based Systems: Structure and Breaches. Internet Technology and Secured Transactions, 2013 International Conference For IEEE, ICITST 2013. - London, UK 2013.

C. Simmons, S. Shiva, H. Bedi , V. Shandilya, ADAPT: A Game Inspired Attack-Defense and Performance Metric Taxonomy, In Security and Privacy Protection in Information Processing Systems, 28th IFIP TC 11 International Conference, SEC 2013, Auckland, New Zealand, July 8-10, 2013.

R. Dharam, S. Shiva, Essential Cloud Security Features in Windows Azure, GCA 2013, Las Vegas, Nevada, USA - July 2013.

A. Abuhussein, H. Bedi, S. Shiva, Towards a Taxonomical Approach for Secure Cloud Computing, IEEE 6th International Conference on Cloud Computing, Santa Clara, CA, USA - July 2013

R. Dharam, S. Shiva, Runtime Monitors to Detect and Prevent Union Query based SQL Injection Attacks, ITNG 2013, and Las Vegas, Nevada, USA. April 2013

.

Abuhussein, H. Bedi, S. Shiva *Evaluating Security and Privacy in Cloud Computing Services: A Stakeholder's Perspective*, 7th International Conference for Internet Technology and Secured Transactions (ICITST), London, UK December 2012.

R. Dharam, S. Shiva *Runtime Monitoring Technique to handle Tautology based SQL Injection Attack,* International Journal of Cyber-Security and Digital Forensics, Vol. 1, No. 3, Nov 2012.

H. Bedi, S. Shiva *Securing Cloud Infrastructure Against Co-Resident DoS Attacks Using Game Theoretic Defense Mechanisms*, Intl. Workshop on Service-Oriented Architecture and Cloud Computing (SOAC), part of ICACCI 2012, Chennai, India. August 2012.

R. Dharam, S. Shiva *Runtime Monitoring - A Post-deployment Security Testing Technique*, International Research Workshop on Advances and Innovations in Software Testing, Memphis, TN, USA, July 2012.

S. Shiva *Security Testing : Status Report*, Sixth International Research Workshop on Advances and Innovations in Software Testing, July 2012, Memphis, TN.

V. Shandilya, S. Shiva *Security in the Cloud: A stake holder's perspective*, International Conference on Security and Management (SAM), Las Vegas. July 2012.

Simmons, S. Shiva, V. Phan, V. Shandilya, L. Simmons *IRS: An Issue Resolution system for Cyber Attack Classification and Management*, International Conference on Security and Management (SAM), Las Vegas. July 2012.

R. Dharam, S. Shiva *Analysis of Monitoring Tools for Java Applications*, International Conference on Software and Computer Applications, Singapore, June 2012.

R. Dharam, S. Shiva *A Framework for Development of Runtime Monitors*, International Conference on Computer and Information Sciences, Kaula Lumpur, Malaysia, June 2012.

R. Dharam, S. Shiva *Runtime Monitors for Tautology based SQL Injection Attacks*, International Conference on Cyber Security, Cyber Warfare and Digital Forensics, Kaula Lumpur, Malaysia, June 2012.

S. Shiva, R. Dharam and V. Shandilya, *Runtime Monitors as Sensors of Security Systems*, 23rd IASTED conference on Parallel and Distributed Computing and Systems, Dallas, December 2011.

S. Shiva *Security Testing : Are We There Yet?*, Fifth International Research Workshop on Advances and Innovations in Software Testing, May 2011, Memphis, TN.

H. Bedi, S. Roy, S. Shiva. *Game Theory-based Defense Mechanisms against DDoS Attacks on TCP/TCP-friendly Flows*, IEEE Symposium on Computational Intelligence in Cyber Security (CICS), part of (SSCI). Paris, France. April 2011.

S. Shiva, H. Bedi, C. Simmons, M. Fisher, R. Dharam. *Holistic Game Inspired Defense Architecture*, International Conference on Data Engineering and Internet Technology, March, 2011.

Anyanwu, N Matthew and Sajjan Shiva, "Implementation and Evaluation of Skip List Data Structure" SIAM Conference on Data Mining (SDM10) April 29 – May 1, 2010**,** Columbus, Ohio.

Sankardas Roy, Charles Ellis, Sajjan Shiva, Dipankar Dasgupta, Vivek Shandilya, Qishi Wu. "A Survey of Game Theory as Applied to Network Security." *43rd Hawaii International Conference on System Sciences (HICSS).* Hawaii, USA, January, 2010.

Sajjan Shiva, Sankardas Roy, Harkeerat Bedi, Dipankar Dasgupta, Qishi Wu. A Stochastic Game Model with Imperfect Information in Cyber Security. *5th International Conference on Information Warfare and Security (ICIW).* Ohio, USA, April, 2010.

Sajjan Shiva, Sankardas Roy, Charles Ellis, Vivek Datla, Dipankar Dasgupta, Qishi Wu. Static and Dynamic Games to Model DoS and DDoS Attacks and Potential Defense Mechanisms. *2010 Spring Simulation Multiconference(SpringSim)* . Florida, USA, April, 2010.

Simmons, Chris; Ellis, Charles; Shiva, Sajjan; Dasgupta, Dipankar; Wu, Qishi, "AVOIDIT: A Cyber Attack Taxonomy" *Technical Report: CS-09-003, University of Memphis,* August, 2009,

Anyanwu, N Matthew and Sajjan Shiva, "Comparative Analysis of Serial Decision Tree Classification Algorithms**"** International Journal of Computer Science and Security (IJCSS) vol.3 issue 3. July 2009, pp. 230-240.

Anyanwu, N Matthew, David Lin and Sajjan Shiva, "Comparison of Cluster Measures" International Conference on Artificial Intelligence and Pattern Recognition(AIPR-09) Orlando, FL 2009, July 13-16, 2009, pp. 348-355.

Anyanwu, N Matthew and Sajjan Shiva, "Application of Enhanced Decision Tree Algorithm to Churn Analysis" International Conference on Artificial Intelligence and Pattern Recognition(AIPR-09) Orlando, FL 2009, July 13-16, 2009, pp. 356-363.

Lee, S.B. Shiva, S.G. "A Novel Approach to Knowledge Sharing in Software Systems Engineering" Fourth IEEE International Conference on Global Software Engineering, (ICGSE) 13-16 July 2009, pp. 376-381, Limerick, Ireland.

Vasile Rus, Xiaofei Nan, Sajjan G. Shiva, Yixin Chen. (2009). Clustering of Defect Reports Using Graph Partitioning Algorithms. In Proceedings of the 21st International Conference on Software Engineering & Knowledge Engineering (SEKE'2009), Boston, Massachusetts, USA, July 1-3, 2009**,** pages 442-445.

Shiva; Lee; Shala; Simmons, “Knowledge Management in Global Software Development” International Journal of Distributed Sensor Networks, June 2009.

Chris Simmons, Charles Ellis, Sajjan Shiva, Dipankar Dasgupta, Qishi Wu. "AVOIDIT: A Cyber Attack Taxonomy." (being submitted to IEEE Security and Privacy Magazine).

Vasile Rus, Sameer Mohammed and Sajjan Shiva, "Automatic Clustering of Defect Reports," International Conference on Software Engineering and Knowledge Engineering, July 2008.

Reluca Stoin, Vasile Rus and Sajjan Shiva, "Predicting Defects in Large Open Source Software," Proc. of the Second International Research Workshop on Advances and Innovations in System Testing, May 2008.

S.G.Shiva, S.B.Lee, L.A. Shala, C.B. Simmons," Knowledge Management in Global Software Development", International Journal of Distributed Sensor Networks, 2008.

S. Shiva and L. Shala, "Using Semantic Wikis to Support Software Reuse," Journal of Software, Vol 3, Issue 4, April 2008, pp. 1-8.

S. G. Shiva, Sarah B. Lee, Lubna A. Shala, and Chris B. Simmons, “Knowledge Management in Global Software Development” (Invited), International Symposium on Advances in Computer and Sensor Networks and Systems, April 2008, Zhengzhou, China.

S. G. Shiva, Teodora R. Stoian, Rajitha R. Satharla, Elhadji A. Ba, Terence P. Hollahan, “An augmented secure software development lifecycle,” Computer Security Conference, April 2008.

S. Shiva and L. Shala, "Using Semantic Wikis to Support Software Reuse," Journal of Software, Academy Publisher, December 2007.

Vasile Rus and Sajjan Shiva , "A General Framework for Information Processing with Application to Quantitative Software Testing ", Proc. of the Workshop on Advances & Innovations in System Testing, May 2007.

S. Shiva and L. Shala, "Software Reuse: Research and Practice", International Conference on Technology: New Generation, April 2007.

S. Shiva and L. Shala, "Adding Security to Rational Unified Process," Computer Security Conference, April 2007.

S. G. Shiva, J. R. Talburt, L. Sherrell and S. Lee, “Computer Science Education – Are we on the right track?,” The Journal of Computing Sciences in Colleges, 21(5), p. 60-61, 2006.

S. G. Shiva, L. Sherrell, S. Lee, and A. Olney, “Engineering Agent-Based Software Systems,” The Journal of Computing Sciences in Colleges, 20(6), p. 28, 2005.

L. Sherrell and S. G. Shiva, "Will Earlier projects Plus a Disciplined Process Enforce Software Engineering Principles Throughout the CS Curriculum?," Proceedings of the 27th International Conf on Software Engineering, St. Louis, MO, May 2005, pp. 619-620.

D. Blain and S. Shiva, "Software Processes in Academia", International conf on Software Engineering Research and Practice, June 2004.

M. Shinde and S. Shiva, "CMMI framework for Small businesses – A case study", International conf on Software Engineering Research and Practice, June 2004.

S. Lee and S. Shiva ,"Comparing Agent Software Development Methodologies using the Waterfall Model," Proc of Americas Conf on Information Systems, Omaha, NE, August 2005.

S. Lee and S. Shiva ,"Comparing Agent Software Development Methodologies using the CMMI Engineering Process Model," Proc of Americas Conf on Information Systems, Omaha, NE, August 2005.

S. Shiva, "Requirements Management," CMMI Workshop, Pittsburgh, December, 2002.

"Anaconda: A Framework for Distributed Internet Computing," *Cluster Computing, 2003* (with P. Ledru).

"Modeling the Decision Making Behaviors within Human Conflict Negotiation", International Conf. on Computers in Multimedia applications, 1999 (with J. Graffagnini and D.C. Patel).

"Expert Systems for Testable Hardware Synthesis", (Invited paper) *International Conference on Computational Intelligence and Multimedia Applications*, February 1998 (with D. Patel).

"Interpartition Communication with Shared Active Packages", *TRI-Ada 96*, December 96 (with P. Ledru).

"Design of a Knowledge-Based Simulation Environment", *Simulation* , August 1996 (with D. Williams and E. Gorman).

"A VHDL Based Expert System for Hardware Synthesis," *VLSI Design Journal*, March 1994, (with J. Jones).

"Expert Systems for Hardware Synthesis - An Overview", *Computing and Control Journal*, April 1993, (with J. Jones).

"A File Integrity Checking System to Detect and Recover from Program Modification Attacks in Multiuser Computer Systems," *Computers and Security*, August 1990 (with R. A. McKoskey).

"VHSIC - Hardware Description Language," *VLSI Design*, June 1985, (with P. Klon).

"Correlation of Adjacent Pixels for Multiple Image Registration," *IEEE Transactions on Computers*, (with H. Ranganath), July 1985.

"Simulation Attributes of HDLs," Radio and Electronic Engineer, *Journal of Inst. of Radio and Electronics Engineers,* UK, January 1984, (with D. C. Patel).

"On the Selection and Development of an HDL," (Invited Paper), *Hawaii International Conference on Systems Science*, January 1984.

"An Automatic Logic Synthesis System," *International Conference on Computers, Systems and Signal Processing*, December 1984.

"An Expert System for VLSI Synthesis," *National Conference on Integrated Circuits, Communications and Signal Processing,* December 1984.

"A New Method for Multiple Image Registration," *National Conference on Integrated Circuits, Communications, and Signal Processing*, December 1984, (with H. Ranganath).

"Automatic Hardware Synthesis," (Invited Paper) *Proceedings of IEEE*, Special Issue on VLSI, January 1983.

"Modular Description/Simulation/Synthesis Using DDL," *IEEE Design Automation Conference*, June 1982, pp. 321-329, (with J. Covington).

"On Describing Multiprocessor Architecture," *Real Time Systems Symposium*, Miami Beach, Florida, December 1981.

"Combinational Logic Synthesis from an HDL Description," *IEEE Design Automation Conference*, Minneapolis, Minn., June 1980.

"Hardware Description Languages - A Tutorial," *Proceedings of IEEE*, December 1979.

"Use of DDL in an Automatic LSI Design and Test System*," International Symposium on CHDLs and Their Applications*, Palo Alto, California, October 1979.

"Realization of Digital Filters Using Input-Scaled Floating-Point Arithmetic," *IEEE Transactions on Acoustics, Speech and Signal Processing*, October 1979, (with J. R. Heath and H. T. Nagle).

"A Numerical Procedure for Renumbering the Nodes of a Digital Network," *IEEE Transactions on Acoustics, Speech and Signal Processing*, February 1978.

"A Unified Approach to the Selection of Structures for Digital Filters," *IEEE International Symposium on Acoustics, Speech and Signal Processing* , Hartford, Conn., May 1977.

"Teaching With Multiple Quizzes _ A Controlled Study," *Alabama A&M University Research Journal*, September 1977.

"Flipflops for Multivalued Logic," *IEEE Transactions Computers*, March 1976, (with T. A. Irving and H. T. Nagle).

"Bypass Multivariable Karnaugh Maps," *Electronic Design*, October 11, 1974, (with H. T. Nagle).

"Reduce State Tables by Computer," *Electronic Design*, October 25, 1974, (with H.T. Nagle).

"Let a Computer Design Memory Circuits," *Electronic Design*, November 23, 1974, (with H. T. Nagle).

"On Multivalued Memory Elements," *International Symposium on Multivalued Logic*, Morgantown, West Virginia, May 1974, (with H. T. Nagle).

REGIONAL CONFERENCE PAPERS

S. Lee and S. Shiva, "CMMI and Agent-based Software Engineering (poster)," Midsouth College Computing Conference, April 2005.

A. Olney and S. Shiva, "Agent Communication languages (poster)," Midsouth College Computing Conference, April 2005.

P. Wang and S. Shiva "A Knowledge-Based Software Reuse Environment", *IEEE Southeastern Symposium on System Theory*, March 1994, .

D. Weldy and S. Shiva "A Study of Tasking Models in Concurrent C, SR and ADA", *IEEE Southeastern Symposium on System Theory, March 1994*, .

R. Virmani and S. Shiva "Implementation of Reliable and Efficient Remote Procedure Calls", *IEEE Southeastcon*, April 1993, .

J. Jones and S. Shiva "Representation and Matching of Knowledge to design Digital Systems," *Fourth Conference on AI for Space Applications*, November 1988 .

M. Campbell and S. Shiva "An Interface Between ADS and VHDL," *Software for Strategic Systems Conference*, October 1988 .

R. Grable and S. Shiva Two Simulations of Cellular Array Machines, *Southeastern Conference on Computer Simulation*, October 1987, .

P. Klon and S. Shiva "Hologram Representation of Design Data in an Expert System Knowledge Base," *Conference on Space Applications of AI*, November 1986,

M. Paulk and S. Shiva "Interprocess Communications in Ada," *IEEE Southeast Conference*, April 1984, .

C. Pucket and S. Shiva "On Input/Output Bus Architectures," *Southeastern Symposium on System Theory*, March 1983, .

C. Srinivas and S. Shiva "Automatic Hardware Synthesis and Minimization," *Southeastern Symposium on System Theory*, March 1983 .

A. M. Shah and S. Shiva "Hardware Synthesis Using DDL," *IEEE Southeast Conference*, Huntsville, Alabama, April 1981, .

J. Covington and S. Shiva "Modular Hardware Synthesis Using HDLs," *IEEE Southeast Conference*, Huntsville, Alabama, April 1981, (with).

S. Shiva "Design Automation of Digital Computers," *IEEE Rocket City Seminar*, Huntsville, Alabama, February 1980, (Invited).

S. Shiva and G. Weathers "Using the Microcomputer as an Instructional Tool in Technology Programs*," First Annual Symposium on Microprocessors and Education*, Tuscaloosa, Alabama, December 1977, (with).

S. Shiva and K. R. Chakravarthi "A Method for Finding the Boolean Difference of Switching Functions," *IEEE Southeast Conference*, Williamsburg, Virginia, April 1977, .

S. Shiva "Generation of Prime Implicants Using Miniterm Sublist*," Eight Annual Symposium on System Theory*, Knoxville, Tennessee, April 1976.

S. Shiva and H. T. Nagle "Boolean Function Minimization by Digital Computer*," Fiftieth Annual Meeting of Alabama Academy of Sciences*, Huntsville, Alabama, April 1973, .

S. Shiva and H. T. Nagle "Computer-Aided Design of Sequential Machines," *Fifth Annual Symposium on System Theory*, Raleigh, North Carolina, March 1973, .

TECHNICAL REPORTS
"Embedding Diagnostics into Reengineered Applications," US Army TMDE Activity, September 1993.

"Modification of Nickel-Hydrogen Battery Expert System," NASA-MSFC, August 1991.

"Software Engineering Environment Specification," Final Report, US Army MICOM, October 1990.

"Nickel-Hydrogen Battery Expert System," NASA-MSFC, August 1990.

"Software Maintenance Methodologies and Performance Evaluation," US Army MICOM/SED, September 1989.

"Automated Data Processor and Network Architecture Design Tool Enhancement Analysis," Final Report, US Army Strategic Defense Command, June 1988.

"Development of an Expert Hardware Synthesis System," Final Report, ARO Contract DAAG29-84-K-0114, September 1984.

"Performance Evaluation of Real-Time Computer Systems," Colsa Inc., November 1983.

"DDL System Users Manual," NAS8-33096, January 1983.

"DDL System Programmer's Manual," NAS8-33096, January 1983.

"DDL Software System - Final Report," NAS8-33096, January 1983.

"Architectural Description Language," Final Report, Delivery Order 1611, BMD Systems Command, January 1981.

"Hardware Synthesis from DDL - Extensions and Logic Minimization," NASA, NAS8-33096, Technical Report, University of Alabama in Huntsville, Huntsville, Alabama, October 1981.

"Hardware Synthesis Using DDL Description," NASA, NAS8-33096, Second Annual Report, University of Alabama in Huntsville, Huntsville, Alabama, October 1980, (with A. M. Shah).

"Operating Systems Requirements for BMD DDP System," Final Report, DASG60-79-C-0015, Espee Inc., January 1980, (with S. P. Singh).

"Digital Systems Design Language," NASA, NAS8-33096, First Annual Report, University of Alabama in Huntsville, Huntsville, Alabama, October 1979.

"A Comparison of Hardware Description Languages," NASA NSG-8057, Final Technical Report, Alabama A & M University, Huntsville, Alabama, October 1978.

"An Awareness of Computer Applications in Society," NS SMI-77-14716, Final Technical Report, Alabama A & M University, Huntsville, Alabama, October 1978.

"Hardware Design Languages - A Bibliography," NASA, NSG-8057, March 1978.

"A Computer Aided Procedure for Complete Design of Sequential Machines," TR#AU-T-26, Project Themis, Auburn University, Auburn, Alabama, March 1973, (with H. T. Nagle).

"A Fast Algorithm for Complete Minimization of Boolean Functions," TR#AU-T-25, Project Themis, Auburn University, Auburn, Alabama, June 1972, (with H. T. Nagle).

Professional Society Affiliations and Activities

Institute of Electrical and Electronic Engineers (IEEE):
- FELLOW since 1993
- Served as:
  - Chairman, Region 3, IEEE Computer Society
  - Associate Editor, VLSI Technical Committee Newsletter
  - Executive Committee Member of Huntsville Chapter of Computer Society
  - Editor, IEEE Computer Society (Region 3) Area Newsletter

ABET/ Computing Accreditation Commission
- Commissioner (since 2014)
- Program Evaluation Team Chairman (1993 - 1996)
- Program Evaluation Team Member (1990 – 1993, 2006 - present)

Educational Testing Service (ETS)
- Chair, Committee to revise CS Major Field Test, 2005-6.

DoD VHSIC Program
- Member of the VHDL Formulation Committee
- Member of the Proposal Review Board

U. S. Army Strategic Defense Command
- Member of Architecture Description Language Committee

NSF/US Department of Education
- Member of Proposal Review Board

American Society for Engineering Education
- Campus Activity Coordinator

International Conference on Global Software Engineering, 2010
- Member, Program Committee

Symposium on Microprocessors and Education
- Member of the Founding Organizing Committee
- Program Chairman

Symposium on Artificial Intelligence (From Space ...Down to Earth)
- Member of the Founding Organizing Committee
- Program Chairman

IEEE Rocket City Seminar
- Program Chairman

ACM Computing Reviews
- Regular contributor (More than 20 paper/ book reviews).

Technical Reviewer
- IEEE Transactions on Computers
- IEEE Transactions on ASSP
- IEEE Computer
- Communications of ACM
- ACM Computing Reviews
- Simulation

IEEE Design Automation Conference
International Conference on Computer Hardware Description Languages
International Conference on Parallel Processing
International Symposium on Computer Architecture
International Conference on Distributed Computing Systems

American Society of Engineers from India
Founding Member of Huntsville Chapter
Board of Directors
Program Chairman, 10th Annual National Convention