

# ARUN SEN

## PERSONAL DATA

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Martial Status: Married, one son

Health: Excellent

## EDUCATION

1. B.S. (Honors) in Physics from Bhagalpur University (India), 1968.
2. M.Tech. in Electronics from the Institute of Radio Physics and Electronics, Calcutta University (India), 1971.
3. M.S. in Computer Science from Department of Computer Science, Penn State University, 1976.
4. Ph.D. in Business Administration (specializing in Information Systems) with minors in Finance and Computer Science from the Department of Management Science, Pennsylvania State University, 1979.  
Dissertation title was *On the Theory of Logical Database Design for a Decision Support System*.

## HONORS AND AWARDS

1. Was awarded the *University Gold Medal* for standing First in the B.S. (Honors) Examination.
2. July 1965- September 1968: *National Merit Scholarship* (Awarded by the Ministry of Education, Govt. of India).
3. October 1968- December 1971: *National Merit Scholarship* (Awarded by the University Grants Commission, India).
4. January 1972- November 1973: *All India Research Fellowship* (Awarded by the Council of Scientific and Industrial Research - CSIR, India).

5. March 1974- December 1975: **Teaching Assistant** (Awarded by the Department of Computer Science, Penn State University).
6. March 1976- August 1976: **Teaching Assistant** (Awarded by the Department of Management Science, Penn State University).
7. September 1976- August 1979: **Chief Programmer**, AMIS Project for the Commonwealth of Pennsylvania, Penn State University.
8. Was awarded an *Honorable Mention* in the 1980 DSI Dissertation Competition for my dissertation entitled *On the Theory of Logical Database Design for a Decision Support System*.
9. Received a *Best Paper Award* in 1983 Southeastern DSI Conference.
10. Received the *Best Paper Award* in 1992 Hawaii International Conference on Systems Sciences (HICSS-25) in the Decision Support Systems Track.
11. Received *Business Analysis Research Fellowship*, Texas A&M University, 1997-1999.
12. Received the *Mays Business School Best Researcher Award*, Texas A&M University, 1997-1998.
13. Received the *Mays Research Fellowship* from Mays Business School, 2002-2006.
14. Invited to participate in the *NSF Review Panel*, 2007.

## EMPLOYMENT HISTORY

August 1979- July 1985:	Assistant Professor of Management Science, University of South Carolina (USC).
July 1985- July 1986:	Associate Professor (Tenured) of Mgmt. Science., University of South Carolina (USC).  Faculty Associate, Institute of Information Management, Technology, and Policy, College of Bus. Administration, Univ. of South Carolina.  Research Associate, Center for Machine Intelligence, College of Engineering, University of South Carolina.
July 1986- July 1998:	Associate Professor (Tenured) of Business Analysis and Research, Texas A&M University (TAMU).
August 1997-August 1999:	Endowed Business Analysis Research Fellow, Texas A&M University.
From August 1998:	Professor (Tenured) of Information and Operations Management, Texas A&M University (TAMU).
Sept 2002 – Sept 2006	Mays Research Fellow, Mays Business School, Texas A&M University.

## TEACHING INTERESTS

- **E-Commerce Courses** -- Evolving Technologies in E-Commerce
- **Business Intelligence** -- Data Warehousing and Business Intelligence
- **Customer Relationship Management** -- Customer Relationship Management
- **Enterprise Development** -- Object-Oriented Applications, OO analysis and Design, and Object-oriented languages, Database Management Systems, Systems Analysis and Design, and Design of Components
- **Decision Support Systems/Knowledge Management System**

## COURSES TAUGHT

- **In University of South Carolina (9 NEW Preps from 1979-1986)**

Data Processing	BA 190	Undergraduate Course	(USC)
Mgmt Information Sys	BA 390	Undergraduate Course	(USC)
Systems Analysis	BA 490	Undergraduate Course	(USC)
Database Systems	BA 596	Undergraduate Course	(USC)
Information Systems	BA 796	MBA Course	(USC)
File Management and Data Structures	BA 889	Graduate Course	(USC)
Distributed Processing	BA 890	Graduate Course	(USC)
Advanced Data Base	BA 891	<u>New</u> Graduate Course	(USC)
Decision Support Systems	BA 896	<u>New</u> Graduate Course	(USC)

- **In Texas A&M University (18 NEW Preps from 1986-2007)**

Business Info Sys Concepts	INFO 217/207	Undergraduate Course	(TAMU)
FORTTRAN	INFO 317	Undergraduate Course	(TAMU)
C/C++ Programming Languages	INFO 318	Undergraduate Course	(TAMU)
Data Base Mgmt System	INFO 328	Undergraduate Course	(TAMU)
Systems Analysis	INFO 329	Undergraduate Course	(TAMU)
Mgmt of Info Systems	INFO 427	Undergraduate Course	(TAMU)
Information Systems	INFO 607	MBA Course	(TAMU)
Systems Analysis	INFO 620	Graduate Course	(TAMU)
Data Base Systems	INFO 628	Graduate Course	(TAMU)
Component-based Systems Analysis	INFO 631	<u>New</u> Graduate Course	(TAMU)
Decision Support Systems	INFO 636	<u>New</u> Graduate Course	(TAMU)
Data Warehousing	INFO 637	<u>New</u> Graduate Course	(TAMU)
Customer Relationship Management	INFO 642	<u>New</u> Graduate Course	(TAMU)
Emerging Technologies in E-Commerce	INFO 645	<u>New</u> Graduate Course	(TAMU)
Business Data Mining	INFO 650	<u>New</u> Graduate Course	(TAMU)
Seminar in Complex Problem Solving	INFO 688	<u>New</u> Graduate Course	(TAMU)
Object Orientation	INFO 688	<u>New</u> Graduate Course	(TAMU)
Ontology, Conceptual Modeling, etc.	INFO 688	<u>New</u> Graduate Course	(TAMU)
Distributed Processing	INFO 689	<u>New</u> Graduate Course	(TAMU)
Advanced Data Base	INFO 689	<u>New</u> Graduate Course	(TAMU)

I taught nine new preparations in University of South Carolina, of which two were new course preparations. My average teaching evaluation scores from the seven year in University of South Carolina is around 3.32 in a scale of 1 to 5, 1 being worst teacher and 5 being the best teacher. In Texas A&M University, I taught eighteen preps of

which ten are new course preparations. In Texas A&M University, my average score is around 3.5 for the same scale.

## LEADERSHIP ROLES

### (A) In Program Development

1. Helped design the *IS Graduate Program* in the Management Science department, Univ. of South Carolina. Several M.S. and Ph.D. students specializing in MIS have graduated.
2. Developed and improved several MIS courses in Univ. of South Carolina. They are: BA 390, BA 490, BA 596, BA 889, BA 890, BA 891, and BA 896. I have also developed courses in TAMU which includes BANA 636, INFO 631 (Component-based Systems Analysis and Design) and three INFO 689's (Special Topics on Distributed Processing Systems, Advanced Database Systems and Object Orientation).
3. Helped launch a *Ph.D. Colloquium Series* in University of South Carolina and Texas A&M University.
4. Redesigned and modernized the *Undergraduate Curriculum in Information Systems* in Department of Information and Operations Management, Texas A&M University, 1999-2000. The current catalog reflects these changes.
5. Redesigned and modernized the *Graduate Programs* (Masters and Ph.D.) in Information Systems for the Department of Information and Operations Management, Texas A&M University, 2002-2006.
6. Introduced many new courses like Data Warehousing (INFO 637), Customer Relationship Management Technologies (INFO 642), E-Commerce Technologies (INFO 640), Component Design (INFO 631), and many others. Current set of courses at the graduate level in the catalog reflects this redesign.

### (B) In Chairing Ph.D. Theses

1. Served as a thesis chairman of a Ph.D. Dissertation titled *File Allocation Strategies in Large Network* (Yoon Chung, completed in Summer, 1984; currently in a South Korean University) in Univ. of South Carolina.
2. Served as a thesis co-chairman of a Ph.D. Dissertation titled *Data Allocation Strategies in Large Network* (Rathin Sarathy, completed in Summer, 1990; currently Tenured Professor and Ardmore Professor of Business Administration at Oklahoma State University) in Texas A&M University.
3. Served as a thesis chairman of a Ph.D. Dissertation titled *NEXUS: A Kernel Complex Object Management System* (Santosh Venkatraman, completed in Spring, 1991; currently Tenured Professor and Department Head at Tennessee State University) in Texas A&M University.
4. Served as a thesis co-chairman of a Ph.D. Dissertation titled *AEROBA: A Control Blackboard for Model Formulation* (Shue T. Feng, completed in Spring, 1992; currently in National ChenChi University, Taiwan) in Texas A&M University.

5. Served as a thesis co-chairman of a Ph.D. Dissertation in *Opportunistic Case Based Reasoning in Model Formulation* (Ravi Vellore, completed in Summer, 1992; deceased) in Texas A&M University.
6. Served as a co-chair of a Ph.D. Dissertation in *Knowledge Base Support in Dynamic Real-time Scheduling in a Large Hospital* (Anandhi Bhardwaj, completed in Summer 1993; currently Tenured Associate Professor at Emory University) in Texas A&M University.
7. Served as a thesis chairman of a Ph.D. Dissertation in *Case Based Management System in Model Formulation* (Radha Mahapatra, completed in Summer, 1994; currently Tenured Associate Professor at University of Texas at Arlington) in Texas A&M University.

### (C) In Graduate Program Advising

1. Served as a Graduate Program Advisor managing Information Systems and SCM doctoral programs 2002-2006. Managed 10 Ph.D. students in the program.
2. Served as a Graduate Program Advisor managing a very successful Masters Program in Information Systems 2002-2006. Managed about 150 Masters students in the program.

### (D) In Research Grants and Fellowships

1. Was awarded a travel grant by the ER Institute to attend the 2nd International Conference on ER Approach, 1981 (\$100).
2. Was awarded a summer grant by the Institute of Information Management, Technology and Policy to assess the feasibility of Information Locator System for the State Government of South Carolina, 1983 (\$4800).
3. Was awarded a research fellowship by the Division of Research of the College of Business (USC) to do a project on the use of expert systems techniques in designing a decision support system, Fall 1984 (\$17,000).
4. Worked in the IBM Grants Project for USC. Helped in getting the Preliminary Grant from IBM, 1985 (\$40,000).
5. Was awarded an equipment grant from the Division of Research of the College of Business, USC, 1986 (\$200).
6. Co-Principal Investigator, "An Intelligent Database Management System," awarded by the Excellence in Research Program, Texas A&M University, 1987 (\$45,000).
7. Co-Principal Investigator, "Data Modeling in Engineering Database," awarded by the Excellence in Research Program, Texas A&M University, 1987 (\$36,360).
8. Co-Principal Investigator, Equipment grant to purchase a SUN 3/160 workstation to support the Intelligent Database Research from the Excellence in Research Program, Texas A&M University, 1987 (\$30,000).

9. Co-Principal Investigator, "Internal Audit Evaluation in Bank Management: An Expert System Approach," awarded by the Herbert V. Prochnow Educational Foundation, Madison, Wisconsin, 1988 (\$13,000).
10. Co-Principal Investigator, Equipment grant (Explorer II LX with needed software) from Texas Instruments, Inc., 1988-91 (\$80,000).
11. Co-Principal Investigator, Matching Equipment Grant, TEES, 1991 (\$3200).
12. Received a College of Business Administration grant for Summer Support, 1991, 2002, 2008.
13. Received Summer support from the Department of Business Analysis, 1992, 1993, and 1996.
14. Received a faculty development leave from the College of Business Administration, Texas A&M University, January-May, 1995, September- December, 2004 and September – December 2010.
15. Received a Software Grant from Rational Rose for teaching Graduate Information Systems courses, 2001-2006.
16. Invited to participate in the **NSF Review Panel**, 2007.
17. Received a software grant from Microsoft for MS Dynamics CRM 4.0 tool (Enterprise Version), 2008. It is still continuing.
18. Received as Co-PI from the Office of National Coordinator (ONC) in the Department of Health and Human Service (HHS) a cooperative grant (for the amount of \$6,404,775) to develop a Regional Extension Center for the Central and Eastern regions of Texas (called CentrEast REC) that will help primary care physicians to adopt healthcare IT systems. The project activities span from outreach and education to IT research including data warehousing, data analytics and reporting, portal design and process analysis. The grant is for four years with cost sharing between TAMUS and Department of HHS (<http://healthit.hhs.gov/portal/server.pt?open=512&mode=2&objID=3519> ). **Funded**
19. Received a supplemental cooperative grant for \$384,000 as a Co-PI to the Office of National Coordinator (ONC) in the Department of Health and Human Service (HHS) to include critical care and rural hospitals into the newly formed Regional Extension Center for the Central and Eastern regions of Texas (called CentrEast REC). This will help critical care and rural hospitals to adopt healthcare IT systems. The project activities span from outreach and education to IT research including data warehousing, data analytics and reporting, portal design and process analysis. The grant is for two years with cost sharing between TAMUS and Department of HHS. (<http://www.hhs.gov/news/press/2010pres/09/20100910a.html>). **Funded**
20. Received a second supplemental cooperative grant for \$192,000 as a Co-PI to the Office of National Coordinator (ONC) in the Department of Health and Human Service (HHS) to include critical care and rural hospitals into the newly formed Regional Extension Center for the Central and Eastern regions of Texas (called CentrEast REC) ([http://www.hhs.gov/news/press/rec\\_awards\\_02082011.html](http://www.hhs.gov/news/press/rec_awards_02082011.html)). **Funded**

21. Applied for a Cooperative Grant from Center for Medicare and Medicaid Innovations (CMMI) entitled "PTN - Practice Transformation Network." Participants include: TAMU Mays Business School, TAMU College of Engineering, Rural and Community Health Institute (RCHI)'s CentrEast Regional Extension Center, North Texas Regional Extension Center, Gulf Coast Regional Extension Center, West Texas Regional Extension Center and Texas Hospital Association. (Applied in Feb 2015) (\$45 Million for 4 years) **Under Consideration**

## (E) In Corporate Connections

1. Received the Teradata Software Grant from Teradata Group of NCR for teaching E-Commerce/Data Warehousing courses in 2001 (\$160,000).
2. Received a Teradata Maintenance Grant from Teradata Group of NCR in 2001-2002 (with Evan Anderson) for teaching E-Commerce courses (\$19,000).
3. Member of the Board of National Teradata (NCR) University Network, 2001- 2003.
4. Received a Summer Support/Consulting from the NCR Corporation to study the problems facing Travelocity.com, Summer 2001.
5. Managed a bi-annual industry workshop called **A&M Data Warehousing and Data Mining Workshop** (<http://iops.tamu.edu/dwdm-workshop/index.htm>) 2002-2007. I have been doing several joint research projects with this group such as Data Warehousing Process Maturity project, E-Metrics project and Web Mining project.
6. Consulting with Southeast Texas Health System (SeTHS) to develop a plan for their Clinical Data Warehouse.
7. Working in a project entitled "**Process-based for Patient Centered Medical Home,**" jointly with **National Committee on Quality Assurance**, Washington DC 2013-2015.

## (F) In National Professional Office

1. Vice-Chair, **TIMS College of Information Systems (DSS)** 1991-1992.
2. Member, Search Committee for Editor-in-Chief in **Information Systems Research (ISR)**, an INFORMS journal in Information Systems, 1991-1992.
3. Member, Sub-committee to provide future directions for the ISR journal, 1991-1992.
4. Vice-Chair, **INFORMS College of Information Systems (INFORMS)**, 1993- 1995.
5. Chair, **INFORMS College on Information Systems**, 1995-1997.

## RESEARCH INTERESTS

- ***Database Management Systems***  
Semantic Databases, Deductive DBMS, Extensible Databases, Object-Oriented DBMS, Data Base and Operations Research Modeling, Data Base and EDP Auditing, Enterprise Modeling, and Nested Relations
- ***Distributed Processing Systems -- OR Modeling***  
Topological Design, File Allocation, and Data Allocation
- ***Decision Support Systems***  
DSS Design Framework, Model Management Systems, Model Formulation Systems, Blackboard Systems, Case-Based Reasoning, Business Expert Systems, and Expert Systems in Operations Analysis
- ***Software Reuse and Program Comprehension***  
Reusability and Reuse Management Tools, Program Comprehension, Repository Design and Implementation, Empirical Studies in Software Engineering, Reuse Economics
- ***Case Base Management Systems***  
Design and develop database management tools for case reasoning techniques
- ***Business Intelligence and Data Warehousing***  
Design and Analysis of Data Warehouse, Data Warehouse Model Formalism, Metadata Warehouse/Metadata Management, Data Warehouse Change Management
- ***Customer Relationship Management***  
Customer Relationship Management, CRM Metrics Ontology, CRM strategy and value creation
- ***Data Analytics***  
Data Mining, Web Mining, Web Analytics, and E-Metrics
- ***E-Commerce***  
Web Site Comprehension, Web Site Customer Segmentation, Web Site Expert System
- ***HealthCare IT***  
HIE development, EHR Adoption/Diffusion/Optimization, Care delivery (PCMH and ACO), Care Coordination, Care Transition, Meaningful use, Clinical Data Warehouse (CDW), Clinical DSS, Payment Modeling and Healthcare Analytics

## COMPUTER LANGUAGE PROFICIENCY

Visual BASIC, C/C++, Expert Systems Languages (CLIPS, PROLOG, JESS and LISP), Ontology Languages (Protégé) Database Systems (ORACLE, SQL Server and Teradata), Object-oriented Languages (Java, JavaBeans, JavaScript and C++), Blackboard Systems (GBB-UMass) and others.

## HARDWARE EXPERIENCES

Has worked on SUN, Windows, DOS and Linux environments.



## Masters Committee CHAIRS

1. Served as a thesis chairman of four M.S. theses in MIS in USC:
  - (a) Designing Relational Database Design Consultant in PROLOG,
  - (b) Database Translation in a Heterogeneous Database Environment,
  - (c) A Study of Internal Control in Data Base Design, and
  - (d) A Study of Organizational Internal Control for Database Management Systems and Auditing.
2. Served as a Chair in the committee of Ferdinand Chew (MBA), Kyung Youn (MS-MIS), Pedro Chacin (MBA), Belinda Hale (MBA) and several others in TAMU.
3. Served on many other Masters Committees as a Chair.

## Ph.D. /MS COMMITTEE MEMBERS

1. Served as a member in the committee of Mark Riley (MS-MIS), V. Rajan (MS-CPSC), Teresa Michaelson (MS-Accounting), Tom Neal (MS-MIS), Laurie Teston (MS-MIS), Dennis Pollard (MS-MIS), S. Bommannan (MS-CPSC), Randall Hoppe (MBA), L. Blanco (MS-MIS), V. Nakkala (MS-CPSC), and B. Sambalingamoorthy (MS- CPSC) in TAMU.
2. Served as a Graduate Committee Representative of Lydia Andrade (Ph.D- Poly Science), Christos Makrigeorgis (Ph.D.- IE), and Michelle Hart (Ph.D. - Educational Psychology) in TAMU.
3. Serving as a member in the committee of Peter Man (MS-CPSC), S. Jaishankar (MS-CPSC), John McDermott (MBA), and P. S. Narayan (MS-CPSC) in TAMU.
4. I have served as a Graduate Advisor (Ph.D. Advisor) 2002-2006.

## PAPERS AND PUBLICATIONS

- I. Refereed Journal Articles (Total number of publications is 53. The author names appear in exact order)
  1. “A generalized cellular array for digital communications,” (P. De, S. Bandyopadhyay, A. Sen and A. K. Choudhury), **Journal of Institute of Electrical and Telecommunications Engineers (India)**, Vol. 19, No. 7, 1973, pp. 372- 377.
  2. “Minimal realization of arbitrary switching functions with 2-level networks of isodistinct and isobaric gates,” (P. De, A. Sen, A. Pal, D. Sharma, and A. K. Choudhury), **International Journal of Systems Science**, Vol. 5, No. 6, 1974, pp. 555- 573.
  3. “A tabular method of finding 2-summable and mutually 2-summable pairs of minterms,” (P. De, A. Pal, A. Sen, D. Sharma, and A. K. Choudhury), **International Journal of Electronics**, Vol. 37, No. 3, 1974, pp. 409- 427.
  4. “A self-repairable threshold cellular array,” (A. Sen, S. Bandyopadhyay, P. De, D. Sharma, and A. K. Choudhury), **International Journal of Electronics**, Vol. 37, No. 6, 1974, pp. 727- 734.

5. "Logical data base design in decision support systems," (P. De and A. Sen), **Journal of Systems Management**, Vol. 32, No. 5, May 1981, pp. 28- 33.
6. "A new model for data base abstraction," (P.De, A. Sen and E. Gudes), **Information Systems**, Vol. 7, No. 1, 1982, pp. 1- 12.
7. "Knowledge representation of a data base by a semantic network," (P. De and A. Sen), **International Journal of Policy Analysis and Information Systems**, Vol. 6, No. 1, 1982, pp. 25- 45.
8. "Formalizing users' view modeling in a data base using semantic nets," (P. De and A. Sen), **Journal of Information Science**, Vol. 4, 1982, pp. 19- 31.
9. "Logical data base design: A management-oriented approach," (A. Sen) **Information and Management**, Vol. 5, 1982, pp. 77- 85.
10. "Decision support systems: An activity-oriented design," (A. Sen) **Journal of Information Science**, Vol. 7, 1983, pp. 23- 30.
11. "A new methodology for database requirement analysis," (P. De and A. Sen), **MIS Quarterly**, Vol. 8, No. 3, Sept 1984, pp. 179- 194.
12. "A heuristic approximation for reducing problem size in network file allocation models," (T. Rakes, L. Franz and A. Sen), **Computers and OR**, Vol. 11, No. 4, 1984, pp. 387- 395.
13. "The evolution of a distributed processing network," (L. Franz, A. Sen and T. Rakes), **Information and Management**, Vol. 7, 1984, pp. 263- 272.
14. "Decision support systems: An expert systems approach," (A. Sen and G. Biswas), **Journal of Decision Support Systems**, Vol. 1, 1985, pp. 197- 204.
15. "Schema translation: A three-level semantic abstraction approach," (A. Sen and C. Ching), **Information Systems**, Vol. 11, No. 3, 1986, pp. 255 -270.
16. "Enterprise modeling for database specification and design," (A. Sen and L. Kerschberg), **Data and Knowledge Engineering**, Vol. 2, 1987, pp. 31 - 58.
17. "Network cost analysis for planning configuration change in distributed systems," (A. Sen, T. Rakes and L. Franz), **Journal of Information Science**, Vol. 13, 1987, pp. 235- 246.
18. "Semantic modeling of internal controls in database design," (P. De and A. Sen), **JMIS (Journal of MIS)**, 5, 2, Fall 1988, pp. 39-56.
19. "An expert decision support system for production control," (G. Biswas, M. Oliff and A. Sen), **Journal of Decision Support Systems**, 4, 1988, pp. 235-248.
20. "A simulation analysis of an updated version of the assigned-slot listen-before-transmission protocol," (Saud A. Alshammari, T. R. Rakes and A. Sen), **Simulation**, 50, 3, 1988, pp. 101-111.
21. "Effect of internal controls in data base design," (Ed Doty, A. Sen and S. C. Wang), **Journal of Information Systems**, 3, 2, Spring 1989, pp. 70-91.

22. "Deductive data modeling: A new trend in database management for decision support systems," (A. Sen and J. Choobineh), **Journal of Decision Support Systems**, 6, 1990, pp. 45-57.
23. "Expert assistance for the decision support process using hierarchical planning," (A. Vinze and A. Sen), **IEEE Transaction on Systems, Man and Cybernetics**, Vol. 21, No. 2, March/April 1991, pp. 390-401.
24. "An expert systems assistance to internal audit department evaluation," (A. Sen and Wanda Wallace), **International Journal of Expert Systems with Applications**, Vol. 3, 1991, pp. 51-66
25. "Construction of a model formulation consultant: The AEROBA experience," (A. Sen, A. Vinze and S. F. T. Liou), **IEEE Transaction on Systems, Man and Cybernetics**, Vol. 22, No. 5, Sept/Oct 1992, pp.1220-1232.
26. "Epistemological aspects of objects," (S. Venkatraman and A. Sen), **IEEE Transaction on Systems, Man and Cybernetics**, Vol. 22, No. 2, March/April 1992, pp.351-359.
27. "The K-coverage concentrator location problem," (B. Shetty, R. Sarathy, and A. Sen), **Applied Mathematical Modelling**, Vol 16, February 1992, pp. 94-100.
28. "Use of reason maintenance in model formulation systems," (A. Bharadwaj, A. Sen and A. Vinze), **Omega**, Vol. 21, No. 1, 1993, pp. 123-133.
29. "Modeler: Incorporating experiences to support model formulation - A case-based planning approach," (R. Vellore, A. Vinze, and A. Sen), **Expert Systems with Applications**, Vol 6, 1993, pp. 37-56.
30. "AEROBA: A blackboard approach to model formulation," (A. Vinze, A. Sen and S. F. T. Feng), **JMIS (Journal of MIS)**, Vol. 9, No. 3, Winter 1992-93, pp. 123-143.
31. "Operationalizing the opportunistic behavior in model formulation," (A. Vinze, A. Sen and S. F. T. Liou), **International Journal of Man-Machine Studies**, Vol 38, 1993, pp 509-540.
32. "Blackboard architecture for reactive scheduling," (A. Bharadwaj, A. Vinze and A. Sen), **Expert Systems with Applications**, Vol. 7, 1, 1994, pp. 55-65.
33. "The role of control in the process of model formulation," (A. Sen, A. Vinze and S. F. T. Liou), **ISR (Information Systems Research)**, Vol. 5, 3, September 1994, pp. 219-248.
34. "Case base management systems: Providing database support to case-base reasoners," (R. Mahapatra and A. Sen), **Journal of Database Management**, Vol. 5, 2, Spring 1994.
35. "Formalization of an IS-A based extended nested relation data model," (S. Venkatraman and A. Sen), **Information Systems**, Vol. 20, No. 1, 1995, pp. 53-72.
36. "Use of cognitive process modeling in knowledge base systems integration," (R. Vellore, A. Sen and A. Vinze), **Journal of Decision Support Systems**, 16, 1996, pp. 359-392.
37. "Understanding the complexity of model formulation process: A protocol analytic approach," (Arun Sen and Ajay Vinze) in **Decision Sciences**, Vol. 28, No. 2, Spring 1997, pp. 443- 473.

38. "A constrained nonlinear 0-1 program for data allocation," (R. Sarathy, B. Shetty and A. Sen) in **European Journal of OR**, 102, 1997, pp. 626-647.
39. "The role of opportunism in the software design reuse process," (Arun Sen) in **IEEE Transaction on Software Engineering**, 23, 7, July 1997, pp. 418-436.
40. "From DSS to DSP: A taxonomic retrospection," (A. Sen) in **Communications of the ACM**, 41, 5es, May 1998, p. 28. (Full version in ACM Digital Library, Volume 41, No. 5es, 1998, the URL is <http://www.acm.org/>).
41. "Industrial-strength data warehousing," (Arun Sen and Varghese Jacob), **Communications of the ACM**, September 1998, pp. 28-31.
42. "Scheduling cardiac procedures: A Knowledge based approach," (Anandhi Bhardwaj, Ajay Vinze and Arun Sen), **IEEE Transaction on Engineering Management**, Vol. 46, No. 3, 1999, pp. 322-334.
43. "Metadata management: Past, present and future" (Arun Sen), **Journal of Decision Support Systems**, 37, 2004, pp. 151-173.
44. "A Comparison of Data Warehousing Methodologies," (Arun Sen and Atish Sinha), **Communications of the ACM**, March 2005, Vol. 8, No. 3, pp. 79-84.
45. "Data Warehousing Process Maturity: An Exploratory Study of Factors Influencing User Perceptions," (Arun Sen, Atish P. Sinha, and K. Ramamurthy) **IEEE Transactions on Engineering Management**, 53, 3, August 2006, pp. 440-455.
46. "Current trends in web data analysis," (A. Sen, P. Dacin and C. Pattichis) **Communications of the ACM**, 49, 11, November 2006, pp. 85-91.
47. "Toward Developing Data Warehousing Process Standards: An Ontology-Based Review of Existing Methodologies," (Arun Sen and Atish P. Sinha) **IEEE Transactions on Systems, Man and Cybernetics – Part C**, 37, 1, January 2007.
48. "Data Warehousing Infusion and Organizational Effectiveness," (K. Ramamurthy, Arun Sen and Atish P. Sinha) **IEEE Transactions on Systems, Man and Cybernetics – Part A**, 38, 4, July 2008, pp. 976-994.
49. "An empirical investigation of the key determinants of data warehouse adoption," (K. Ramamurthy, Arun Sen and Atish P. Sinha) **Journal of Decision Support Systems**, 44, 2008, pp. 817-841.
50. "Implementation of personalization engine for an E-Commerce site using open source architecture," (A.Sen, Yingying Chen and Bo Zhang) **Journal of Organizational Computing and Electronic Commerce**, 18, 3, July-September 2008, pp. 224-253.
51. "IT Alignment Strategies for Customer Relationship Management," (Arun Sen and Atish P. Sinha) in **Journal of DSS**, Volume 51, Issue 3, June, 2011, pp. 609-619.
52. "A Model of Data Warehousing Process Maturity," (Arun Sen, K. Ramamurthy and Atish P. Sinha) in **IEEE Transactions on Software Engineering**, 38, 2, March/April 2012, pp. 336-353.

53. "Clinical decision support: Converging toward an integrated architecture," (Arun Sen, Amarnath Banerjee, Atish P. Sinha and Manish Bansal) **Journal of Biomedical Informatics**, 45, 2012, pp. 1009-1017.

## II. Articles Under Review (author names appear in exact order)

1. "A Multistate Multiple-Spell Model of Website Visit Dynamics," (Amit Bhatnagar, Atish P. Sinha and Arun Sen) (under **revision** in *Information Systems Research*)
2. "Sustainability of Healthcare Information Exchanges: A Game-Theoretic Approach," (Emre Demirezen, Subodha Kumar, and Arun Sen) (under **revision** in *Information Systems Research*).

## III. Work in Progress

1. "A Revenue Model for Sustainable Healthcare Information Exchanges," (Subodh Kumar, Arun Sen, Tharanga Rajapakshe and Chelliah Sriskandarajah)
2. "Fee and Benefits Decisions for a Healthcare Network Provider" (Chelliah Sriskandarajah, Subodha Kumar and Arun Sen)
3. "The Influence of Online Promotional Tools on Information Search and Purchase Behavior," (Atish P. Sinha, Amit Bhatnagar and Arun Sen)
4. "Analyzing the Helpfulness of Online Reviews Using a Concept Scripts-Enriched Text Regression Model" (Ngo-Ye, T. L., Sinha, A. P., and Sen, Arun)
5. "Process Ontology of Practice Transformation: An informatics foundation for PCMH Standardization," (Arun Sen and Atish P. Sinha)

## IV. Extended Abstract

1. "A blackboard architecture for the decision support process: design and development issues," (with Ajay Vinze), **Data Base**, Vol 20, 3, Winter 1990, p. 6.

## V. Refereed Proceedings

### A. International Conferences

1. "A formal procedure for requirement analysis in data base design," (with P. De), **Proc. 14th. Hawaii International Conference on System Sciences**, Honolulu, 1981, pp. 127- 136.
2. "An extended entity relationship model," (with E. Gudes and P. De), **Proc. 2nd International Conference on Entity-Relationship Approach**, Washington, D.C., Oct 1981, pp. 459- 476. (Also, appeared in a book titled **Entity-Relationship Approach to Information Modelling and Analysis** (edited by Peter P. Chen), North-Holland Publishing, 1983.
3. "Data requirements planning for an MIS: An activity-oriented approach," (with P. De), **Proc. 15th. Hawaii International Conference on System Sciences**, Honolulu, 1982, pp. 874- 879.

4. "Information resource management: A metadata approach," (with L. Kerschberg and D. Marchand), **Proc. 4th. International Conference on Information Systems**, Dec 15- 17, 1983, Houston, pp. 223- 239.
5. "A framework for expert decision support system design," (with G. Biswas), **Proc. International Conference on Computers, Systems, and Signal Processing**, Bangalore (India), Dec 10 -12, 1984.
6. "Design of an expert system in operations analysis," (with G. Biswas and M. Oliff) **Proc. of the IEEE International Conference on Systems, Man and Cybernetics**, Tucson, Arizona, 1985.
7. "A framework for deductive database design in decision support systems," (with J. Choobineh) in **Proc. International Conference on Information Systems**, Pittsburgh, Dec 6 - 9, 1987.
8. "Aggregation semantics and NF<sup>2</sup> model of data," (with J. Choobineh and H. Hernandez), **Proc. of 23rd Annual Hawaii International Conference on System Sciences**, Vol II, pp. 338-346, 1990.
9. "A case-based planning approach to model formulation," (with Ravi Vellore and Ajay Vinze), **Proc. of the First Conference of the International Society for DSS**, Austin, Sept 12-14, 1990.
10. "Automating model formulation for decision support," (with A. Vinze), **Proc. of 22nd Annual Conference of International Simulation and Gaming Association (ISAGA)**, Quoto, Japan, July 15-19, 1991.
11. "AEROBA: A blackboard approach to model formulation," (with A. Vinze and S. F. T. Feng) in **Proc. of 25th Annual Hawaii International Conference on System Sciences**, Vol III, pp. 551-563, 1992.
12. "A similarity-based clustering algorithm to cluster cases in a case-object server," (with R. Mahapatra), **Proceedings of the Third Annual Workshop on Information Technologies and Systems (WITS)**, Orlando, Florida, pp. 206-215, 1993.
13. "Reuse-Based Questionnaire Design in Survey Research," (with Marietta Tretter), **Proceedings of the Ninth Annual Workshop on Information Technologies and Systems (WITS)**, Charlotte, North Carolina, December 11-12, 1999.
14. "Ontological Derivation of Actionable E-Metrics," **Proceedings of WEB 2005**, Las Vegas, December 10, 2005.
15. "Decision Support Technologies for CRM," Extended Abstract in **9th International Conference on Decision Support Systems**, Kolkata, India, January 2-5 2007.
16. "Healthcare Information Exchange: A Game-theoretic Analysis," (Emre Demirezen, Subodha Kumar and Arun Sen) in **2012 WITS Conference**, Orlando, Florida, December 15-16, 2012.
17. "Sustainability of Healthcare Information Exchanges: A Network Externalities Approach," (Emre Demirezen, Subodha Kumar and Arun Sen) in **2014 WITS Conference**, Auckland, New Zealand, December 15-16, 2014.
18. "Sustainability of Healthcare Information Exchanges: A Network Externalities Approach," (Emre Demirezen, Subodha Kumar and Arun Sen) in **2014 WISE Conference**, Auckland, New Zealand, 2014.

- B. Invited National Workshop
1. "Mapping the entity-relationship model to a blackboard architecture," (with Ajay Vinze, Craig Boyle, and S. Liou) in **Fourth Workshop on Blackboard Systems (American Association of Artificial Intelligence)**, Boston, Mass, August 29, 1990.
- C. National Conferences
1. "On the use of cost-benefit analysis in gerontological management information system," (with J. Hayya and W. J. Sauer), **Proc. 10th National Conference on Decision Sciences Institute (DSI)**, Oct 30- Nov 1, 1978, St. Louis, Missouri, p. 304.
  2. "Conceptualization of multicriteria record segmentation problem in large shared databases," (with L. Franz), **Proc. of 12th National Conference of the DSI**, Las Vegas, Nov 5- 7, 1980, p. 372.
  3. "Allocation of replicated and partitioned files in a distributed network with planned redundancy," (with T. Rakes and L. Franz), **Proc. 13th National Conference of the DSI**, Boston, Nov 18 -20, 1981, p. 421.
  4. "Testing the event state model for requirement analysis in database design," (with P. De), **Proc. of 12th Annual Pittsburgh Conference on Modeling and Simulation**, 1982, pp. 571- 575.
  5. "A conceptual framework for knowledge base systems," **Proc. of the 13th Annual Pittsburgh Conference on Modeling and Simulation**, 1982, pp. 571- 575.
  6. "A conceptual framework for network topology design," **Proc. of the 14th National Conference of the DSI**, San Francisco, Nov 22- 24, 1982.
  7. "A conceptual design for management decision support: A knowledge base approach," (with P. De), **Proc. of the 15th National Conference of the DSI**, San Antonio, Nov 21- 23, 1983, pp. 215- 218.
  8. "Mechanized analysis of data dictionaries (MADD): A conceptual framework," **Proc. of the 16th National Conference of the DSI**, Toronto, Nov 5 - 7, 1984.
  9. "An expert system for operations analysis: An opportunity for productivity improvement ," (with M. Oliff and G. Biswas), **Proc. of the 17th National DSI Conference**, Las Vegas, 1985.
  10. "A semantic modeling of organizational controls," **Proc. of the 17th National DSI Conference**, Las Vegas, 1985.
  11. "Model recognition for model management in decision support system: An expert systems approach," (with A.M. Quayle), **Proc. of the 18th National DSI Conference**, Honolulu, 1986.
  12. "A study of internal control in a data base environment," (with Ed Doty), **Proc. of 19th National DSI Conference**, Boston, November 23 -25, 1987.
  13. "QUESTOR: An expert systems approach to internal audit department evaluation in banks," (with Wanda Wallace) in **Proc. of 20th National DSI Conference**, Las Vegas, Nov 21-23, 1988.
  14. "A framework for complex object management," (with S. Venkatraman) in **Proc. of 22nd National DSI Conference**, San Diego, Nov 19-21, 1990.

15. "Data allocation in a distributed relational database," (with B. Shetty and R. Sarathy) in **Proc. of the 22nd National DSI Conference**, San Diego, Nov 19-21, 1990.
16. "Understanding the case-based approaches to model formulation," (with R. Vellore and Ajay Vinze), in **Proc. of the 22nd National DSI Conference**, San Diego, Nov 19-21, 1990.
17. "Sustainability of Healthcare Information Exchanges," (Emre Demirezen, Subodha Kumar and Arun Sen) in **2014 INFORMS' Conference on Information Systems and Technology (CIST)**, San Francisco, November 8-9, 2014.

#### D. Regional Conferences

1. "Forecast of the second destination transportation tonnage for the air force: A case study," (with J. Hayya, J. E. Tysworth, P. Gross), **Proc. the S. E. DSI Conference**, Orlando, 1980, pp. 228- 230.
2. "Configuration planning for distributed data base systems," (with L. Franz), **Proc. of the S. E. DSI Conference**, Charlotte, 1981, pp. 124- 126.
3. "Managing the evolution of distributed processing networks: A framework," (with T. Rakes and L. Franz), **Proc. of the S. E. DSI**, Memphis, 1982, pp. 34- 36.
4. "The effect of traffic variance on optimal file allocation in a distributed data system," (with T. Rakes and S. Anderson), **Proc. of the S. E. DSI Conference**, Williamsburg, 1983, pp. 96- 98.
5. "Designing data abstractions for EDP auditors: Some alternative frameworks,"(with B. Killingsworth), **Proc. of the S. E. DSI Conference**, Savannah, 1984, pp. 112-114.

#### VI. Non-refereed Publications

1. "A comparative study of reliability measures for a distributed processing star network," (with T. Rakes and L. Franz), **Proc. of the S. E. TIMS**, Atlanta, 1981, pp. 144- 151.
2. "A new approach for testing and realization of a set of Boolean functions by variable-threshold elements," (with A. Pal, P. De, D. Sharma, and A. K. Choudhury), **Proc. of the Symposium on Circuits, Systems and Computers**, India, 1975.
3. "Distributed data processing and OR - A survey," (with B. Shetty, S. Venkatraman and R. Sarathy) in **TIMS National Meeting**, Denver, Colorado, 1988.
4. "Knowledge representation using NF<sup>2</sup> relations," (with J. Choobineh) in **TIMS National Meeting**, Vancouver, Canada, May 1989.
5. "Expert assistance to the decision support process (XDSP): A Blackboard Architecture" (with Ajay Vinze) in **TIMS National Meeting**, Las Vegas, Nevada, 1990.
6. "A cognitive model to support case-based planning" (with Ajay Vinze and Ravi Vellore), in **TIMS National Meeting**, Philadelphia, Penn, Oct 29-31, 1990.
7. "Implementation of blackboard systems in model formulation," (with Ajay Vinze), in **TIMS National Meeting**, Nashville, Tenn, May 12-15, 1991.



8. "Importance of Similarity: An Overview," (with P.De), in **INFORMS National Meeting**, New Orleans, Louisiana, Oct 29- Nov 1, 1995.

## **DEPARTMENTAL, COLLEGE, AND UNIVERSITY COMMITTEE WORK**

1. Member, Self Management Center Advisory Committee in USC, 1979- 1980.
2. Member, University Graphics Committee, USC, 1980- 1981.
3. Member, Business School Library Committee, USC, 1980-1981, 1982- 1984.
4. Member, Business School Library Task Force, USC, June 1985- July 1986.
5. Senator, University Faculty Senate, USC, August, 1985 - July, 1986.
6. Member, Ph.D. Committee in the Business Analysis department, TAMU, 1987-1991.
7. Member, Knowledge Systems Research Program Committee, TAMU, 1986-1989.
8. Member, INFO Ad hoc Ph.D. Review Committee, 1990.
9. Member, CBA Research Committee, TAMU, 1988-1991.
10. Member, University Fiscal Appeals Panel, TAMU, 1991- 1992.
11. Member, CBA Computer User Committee, TAMU, 1991- present.
12. Assisting doctoral students in the Teaching Portfolio Seminar, TAMU, 1993.
13. Member, University Students Appeals Committee, TAMU, 1993-1994.
14. Member, CBA Committee on Computing Requirement for the Wehner Building, TAMU, 1993-1994.
15. Member, INFO Departmental Committee on Working Paper Implementation, TAMU, 1993-1994.
16. Member, Ph.D. Committee in the Information and Operations Management department, 1998-2006.
17. Senator in TAMU Faculty Senate, 1998-2000.
18. Chair, Departmental Undergraduate Curriculum Committee, 1998-1999.
19. Member, Departmental Advisory Committee, 1998-1999, and 2001-2002.
20. Chair, Departmental Faculty Search Committee, 1998.
21. Member, Departmental Faculty Search Committee, 1997, 1999-2000.
22. INFO Departmental Graduate Advisor (MS and Ph.D.), 2002- 2006.

23. Member, Texas A&M University Faculty Development Leave Committee, 2007- 2010.
24. Member, Texas A&M University Council of Principal Investigators, 2012-2015.

## EXECUTIVE SEMINARS TAUGHT

1. Participated in the Executive Seminar on Distributed Processing offered by the Daniel Management Center, College of Business Administration, University of South Carolina, April 10-11, 1980.
2. Participated in the Executive Seminar on Data Base- A Management Briefing offered by the Daniel Management Center (USC), Feb 18 - 19, 1981.
3. Participated in the Executive Seminar on Information Technology Management for the Office of the Governor of the State of South Carolina offered by the Daniel Management Center (USC), July 21- 22, 1982.

## PROFESSIONAL ACTIVITIES- INTERNATIONAL

1. Session Chairperson, **1992 and 2001 ICIS Conference**.
2. Discussant in **ICIS Conferences**.
3. Guest Speaker in **IEEE Guest Speaker Series**, Indian Institute of Technology, Kharagpur, India, in December, 1992.
4. Coordinator of a mini-track **Blackboard Paradigm and its Applications** (with A. Vinze) in HICSS (Hawaii International Conference in Systems Sciences), 1992 and 1993.
5. Member, Program Committee, **1992, 1999 and 2001 International Conference in Information Systems (ICIS)**.
6. Member, Program Committee, **Second International Conference on Information Systems and Management of Data**, New Delhi, India, 1993.
7. Member, Program Committee, **1993 Workshop in Information Technology and Systems (WITS), 1994 WITS, 1995 WITS, 1997 WITS, 1998 WITS, 1999 WITS, 2000 WITS, 2006 WITS, 2007- 2012 WITS**.
8. Member, Program Committee, **1996 INFORMS Conference on Information Systems and Technologies**, held in Spring, 1996.
9. Program Chair, **1996 WITS**, held in Cleveland, Ohio.

## PROFESSIONAL ACTIVITIES- NATIONAL

1. Chairman, MIS table topic session, **13th National DSI Conference**, 1981.

2. Session organizer and session chairman, **13th Annual Conference on Modeling and Simulation**, 1982.
3. Workshop organizer in **16th National DSI Conference**, 1984. (Title of the workshop: “DSS Design using Expert Systems Approach”).
4. Discussant in **National DSI Conference**.
5. Evaluator for the Best Paper Award in the **1992 DSI Conference**.
6. Invited to participate in the **1993 DSI Doctoral Consortium** held November 19-20, 1993 in Washington, D. C.
7. Session Chairperson in **DSI** and, **TIMS/ORSA Conferences**.
8. Invited to participate in the **1993 DSI New Faculty Consortium** held in Washington. D. C.
9. Track Chair, AI and DSS Track, **1996 National DSI Conference** to be held in Orlando, Florida.
10. Member, Program Committee, **INFORMS Conference on Information Systems and Technologies (CIST)**, 1996 (held in Washington DC), 1997 (held in San Diego) and 1998 (held in Montreal, Canada).

## PROFESSIONAL ACTIVITIES- REGIONAL

1. MIS Track Chairperson, **1986 SE DSI Conference**.
2. Arranged **TexIS Ph.D. Consortium** on April 6, 1990 held in College Station.
3. Founded **A&M Workshop on Data Warehouse and Data Mining**.

## NATIONAL OFFICE

1. Vice-Chair, **TIMS College of Information Systems (DSS)** 1991-1992.
2. Member, Search Committee for Editor-in-Chief in **Information Systems Research (ISR)**, an INFORMS journal in Information Systems, 1991-1992.
3. Member, Sub-committee to provide future directions for the ISR journal, 1991-1992.
4. Vice-Chair, **INFORMS College of Information Systems (INFORMS)**, 1993- 1995.
5. Chair, **INFORMS College on Information Systems**, 1995- 1997.

## EDITORSHIP WORK

1. Member of the Editorial Board, **Journal of Database Management**, Idea Group Publishing Company, 1989- 1996.

2. Guest Editor (with A. Vinze), **Special Issue of Expert Systems with Applications (The Blackboard Paradigm and Its Applications)**, Vol. 7, 1, 1994, Pergamon Press.
3. Guest Editor (with A. Vinze), **Special Issue of Journal of Decision Support Systems (Model Formulation: Theory, Process and Support Systems)**, published in 1995, North-Holland.
4. Guest Departmental Editor, **DataBase**, 1995.
5. Associate Editor, **Journal of Database Management**, 1996- 2000.
6. Guest Editor (with George Ernst), **Special Issue of Decision Support System (on WITS'96)**, published in 1998, North-Holland.
7. Guest Editor, **Special Issue of Information Systems (on WITS'96)** published in 1998, Elsevier Press.
8. Guest Editor (with Varghese Jacob), **Special Issue of Communication of the ACM (on Data Warehousing)** published in Fall, 1998.

## REVIEW WORK

1. **Journal Reviewer**  
MIS Quarterly, Decision Sciences, Communications of ACM, Data and Knowledge Engineering, IEEE Transaction on Computers, Omega, ISR, Journal of DSS, Naval Research Logistics Quarterly, IEEE Computer, Operations Research, IJMMS, Information Systems, DATABASE and JDM.
2. **Conference Reviewer**  
8th Very Large Data Base, SIGMOD, National DSI Conferences, SE DSI Conferences, Expert Data Base Conference, IEEE INFOCOM87, ICIS Conferences, HICSS Conferences, CISM93, WITS Conferences and 1996 INFORMS- CIST.
3. **External Evaluator for Tenure and Promotion**
  - Arizona State University
  - Georgia Tech University
  - Ohio State University
  - Penn State University,
  - Purdue University,
  - University of Georgia,
  - University of South Carolina
  - Virginia Tech
  - Virginia Commonwealth University
4. **Manuscript Review**
  - Reviewed a manuscript proposal from John Wiley in 1990.
  - Reviewed a manuscript pre-proposal.