

**GURPUR M. PRABHU**

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**EDUCATION**

Ph.D., Computer Science, Washington State University, 1983  
M. Tech., Computer Science, I. I. T. Kanpur, India, 1978  
B. Tech. (with distinction), Electronics Engineering, I. I. T. Madras, India, 1975

**PROFESSIONAL HISTORY**

August 1989 – Present: Associate Professor, Iowa State University  
August 1983 – August 1989: Assistant Professor, Iowa State University  
September 1979 – August 1983: Teaching Assistant, Washington State University

Member of the IEEE, and honor societies Sigma Xi, Phi Kappa Phi, and Upsilon Pi Epsilon.

**RESEARCH**

**Areas of interest:** Parallel processing, Information integration and information retrieval, Applications of special relativity.  
**Publications:** 26 Journals, 24 refereed conferences, and 6 juried conferences  
**Graduate Students:** 193 POS Committees: 7 Ph.D. Supervisions, 30 M.S. Supervisions, 42 Ph.D. POS committees, 114 M.S. POS committees  
**Reviewer For:** 12 Journals, 9 Conferences, NSF, and DARPA

**TEACHING**

Developed and taught 19 different courses over the last 24 years. Evaluations are very good and I am considered one of the best teachers in the department by many students.

Mentored several female and minority students as part of the Women in Science and Engineering program and the Research Careers for Minority Scholars program.

Recipient of Outstanding Achievement in Teaching Award from the College of Liberal Arts and Sciences, 2008.

**ADMINISTRATION**

Leadership role on many committees, Chair of the Undergraduate Committee since 1994, Associate Chair (2002-03), Departmental Accreditation Coordinator (since 1998).

## RESEARCH STATEMENT

Over the last several years I have carried out research in the areas of parallel processing and information technology. Some of the problems I worked on are described below. With the advent of Internet-enabling technologies my current interests are to develop semantic-based mechanisms for information retrieval and information processing. While the Internet has connected islands of locally networked computer systems, my focus is on logically bridging isolated islands of data. By making data easy to access and easy to process, I hope to advance the state of the art in the development of information applications for scientific discovery using Grid computing, and decision-making domains such as biological sciences, E-commerce, E-governance, and information analysis for combating crime and terrorism.

### Parallel random number generation

An important problem I solved with graduate student Srinivas Aluru was that of generating random numbers for parallel computers. Efficient parallel random number generation is essential for parallelizing the numerous applications that depend on random numbers. Linear congruential generators are easily parallelizable but exhibit regularities that make them unsuitable for a number of applications. We developed an efficient parallel random number generator ( $O(1)$  parallel time per generation of one number on each processor) based on the lagged Fibonacci exclusive-OR generator, also known as the generalized feedback shift register generator. We have received requests for this generator from several researchers. Srinivas Aluru subsequently proved that the Exclusive-OR lagged Fibonacci generator is the only one that can be efficiently parallelized, and the additive and multiplicative lagged Fibonacci generators cannot be.

### The N-body problem

Another problem that Aluru and I worked on is the N-body problem. The N-body problem consists of simulating the motion of N particles under the influence of mutual force fields based on an inverse square law. This problem has applications in several domains including radiosity methods in computer graphics, astrophysics, molecular dynamics, fluid dynamics, and numerical complex analysis.

Research efforts have focused on reducing the  $O(N^2)$  time per iteration required by the naïve algorithm of computing each pairwise interaction. Notable algorithms that have gained wide popularity are the Barnes-Hut and Greengard algorithms. The fastest algorithm is by Greengard, whose Ph.D. thesis won the ACM distinguished dissertation award in 1988. Greengard's algorithm claims to compute the pairwise interactions in  $O(N)$  time per iteration.

We proved that Greengard's algorithm is not  $O(N)$  as claimed. The argument is based on the choice of problem precision as a constant in Greengard's analysis. Both Barnes-Hut and Greengard's methods use a data structure whose size depends on the spatial

distribution of the particles. This makes it impossible to establish bounds on these algorithms without assumptions of the particle distributions. We have shown that performance claims of these algorithms are invalid even with particle distributions resulting in the smallest running times. A journal paper on this result was published in the *SIAM Journal of Scientific Computing* along with papers in Supercomputing '94 and the Journal of Supercomputing in 1998.

### **Interdisciplinary Efforts**

Two of my doctoral students, Naresh Nayar and Milton Wikstrom, did their work in computational science by using high-performance techniques in the areas of weather modeling and computational chemistry. I mentored Prof. Charles Wright's student, Diane Rover, who worked at the Scalable Computing Laboratory and her work on visualization of program performance and the SLALOM benchmark have received national research awards. Another recent doctoral student, Rajat Todi, used the HINT benchmark to evaluate file access patterns for realistic I/O workloads in cluster environments. Along with doctoral student Babak Forouraghi, I studied the design of learning algorithms for flaw classification of materials used in nondestructive evaluation. Babak Forouraghi, Prof. Lester Schmerr and I developed a novel technique for multiobjective optimization that combined concepts from fuzzy logic, machine learning, and multivariate statistics. Our research papers from this work have appeared in the AAAI national conference on artificial intelligence, the international conference on fuzzy systems and the world congress on expert systems.

### **Information and Internet Technologies**

During 1990 to 1992 I was the principal investigator in an industrial grant from Next Generation Management Systems. The task was to propose an integrated information technology solution for their distribution operations. Dr. Sree Nilakanta of the College of Business was a co-investigator with me and we examined various technologies and recommended an enterprise integration architecture with an open systems software foundation.

### **Current and Future Projects**

At the current time I am involved in Internet-enabling technologies and intelligent distributed computing. Much of the existing work is protocol- and syntax-based. My interest lies in exploring semantic-based search techniques for information retrieval and processing. Distributed Computing is an all-encompassing concept, consisting of, but not limited to, metadata, application logic, interfaces, performance management, database integrity, middleware technology, and recent trends such as autonomic computing, pervasive computing, and proactive computing. The distributed computing model has distributed data sources on one side and distributed users of data on the other side. In order to be effective and efficient, there are three kinds of problems that must be addressed:

- (1) Data and the processing logic are provided entirely by each of the data sources for use by the large set of distributed users.
- (2) Data alone is provided by the data sources but the processing logic is provided by the distributed users.
- (3) The data processing logic provided, partly by the data sources, *and* partly by the distributed users, should work cooperatively through effective, intelligent communication in a secure and scalable environment.

Problems (1) and (2) listed above have been solved elegantly by Semantic Bridge that was designed and developed during 1999 – 2002. This approach employs user-defined *programs* in place of user-defined queries, thereby combining the advantages of the RPC and Query Interface mechanisms. The objectives of Semantic Bridge are to:

- Enable the development of abstract, database schema/implementation-neutral programs to meet the specific needs of remote users.
- Enable the development of abstract, database schema/implementation-neutral programs to service standard, universally accepted semantics such as standard Business Reports, without requiring the data sources to provide the implementation.

The above objectives are accomplished without compromising either the data security, or the system security of the hosts. The main advantages gained are scalability and maintainability.

### **Self-Aware Computing**

The next goal of my research is to address Problem (3) in the above list – to design a system where the data processing logic provided by the data source works cooperatively with the data processing logic supplied by the distributed user. An additional goal of the project which is a direct consequence of the proposed approach is to design a system of writing programs that make computers aware of the actions they take. This will enable computers to dynamically interact with other computers in complex decision-making scenarios, and empower them to make intelligent decisions. The ultimate aim is to enable computers to understand the meaning of computations, communicate with other computers, and act sensibly without the need for external human or program intervention in a wide variety of situations. To achieve this goal, the following objectives have been set to develop the structural framework needed to design intelligent distributed systems:

- (1) A mechanism to capture through modeling, a computationally acceptable notion of semantics of every external input which can be utilized by the parallel execution of a ‘self-aware’ process.
- (2) To develop a general decision-making algorithm for any problem-solution space for the parallel self-aware process based on this semantic information and a parameterized value system defined by the developer.

- (3) To develop extensions to Semantic Bridge to allow external programs to interact with “intelligent” data sources.
- (4) To develop a complete set of tools for implementing systems using the above architecture for designing intelligent systems.
- (5) To investigate the performance of the intelligent system in different situations for a given domain.

A number of theories and models from the disciplines of cognitive science, linguistics, psychology, and computer science are used to address the above objectives. Specifically, we use Perceptual Control Theory (PCT), Affect Control Theory (ACT), Head-driven Phrase Structure Grammar (HPSG), Aspect Oriented Programming (AOP), Dooyeweerd’s Aspects, Jackendoff’s Conceptual Structures, Category Theory, Answer Set Programming (ASP), Dialog Game Board, and Semantic Bridge to design and implement our intelligent computer system.

I have been the major professor of 7 Ph.D. students and 32 Masters students and published over 50 papers in journals and conferences. I have served on the graduate committees of 37 Ph.D. students and 112 Masters students. I consider the mentoring of graduate students as a very important facet of research. My role includes assisting students in identifying good research problems, suggesting lines of approach, and emphasizing the need to maintain high scientific standards. In this process, I try to lead my students towards those areas where their strengths lie; recognizing where these strengths are is a gradual process that requires continual re-evaluation. My job as an advisor includes teaching my students how to write technical papers. This is a time-consuming task, often as time-consuming as doing the research itself. I painstakingly revise successive drafts, providing suggestions for improvement while resisting the temptation to write the papers myself.

In many cases I have not included my name on the published paper, allowing students to get motivated by writing and publishing a paper by themselves. I have also followed this principle for students on whose graduate committees I have served on. Although I have contributed several ideas on the computational aspects of the work of interdisciplinary Ph.D. and Masters students, I have resisted from including my name on the final publications arising from their work. I believe this motivates students and instills in them the confidence to pursue research careers in academia or industry. My advising extends to the early stages of career development, where I counsel students on the options available to them.

Since 1994 I have been in charge of the Undergraduate program, carrying out many duties that are normally performed by an associate chair in many departments. From 1998 to 2002 we underwent a transition in leadership with two interim chairs and I took the initiative to be in charge of accreditation and other aspects of the Undergraduate curriculum to provide some stability to our program. The responsibilities and duties of this role took time away from proposal writing and to some extent my research activities. But with my efforts having succeeded in creating a quality undergraduate program worthy of continuous accreditation, I have now started focusing more on research.

## PUBLICATIONS

### Journals

1. "Algorithms for generating fundamental cycles in a graph," (with N. Deo and M. S. Krishnamoorthy), *ACM Transactions on Mathematical Software*, Vol. 8, No. 1, pp. 26-42, 1982.
2. "On the power of perturbation for testing non-isomorphism of graphs," (with N. Deo), *BIT* 24:3, pp. 302-307, 1984.
3. "The ellipsoid algorithm and the graph isomorphism problem," (with N. Deo), *RAIRO - Technique et Sciences Informatique*, Vol. 3, No. 5, pp. 301-306, 1984.
4. "A multipath network with cross links," (with S. C. Kothari and Robert Roberts), *Journal of Parallel and Distributed Computing*, 5, pp. 185-193, 1988.
5. "The kappa network with fault-tolerant destination tag algorithm," (with S. C. Kothari and Robert Roberts), *IEEE Transactions on Computers*, Vol. 37, No. 5, pp. 612-617, 1988.
6. "Performance analysis of multistage interconnection networks," (with S. C. Kothari, Robert Roberts, and Anita Jhunjhunwala), *Information Sciences*, 44, pp. 71-78, 1988.
7. "A parallel computer implementation of power system transient stability assessment using the TEF method," (with V. Vittal and Swee Lim), *IEEE Transactions on Power Systems*, vol. 6, no. 2, pp. 167-173, 1991.
8. "Visualization of program performance on concurrent computers," (with Diane Rover and Charles Wright), *Lecture Notes in Computer Science*, vol. 507, pp. 154-160, 1991.
9. "An experiment for teaching fundamentals of parallel processing," (with Charles Wright, Diane Rover and Gretchen Vogel), *Lecture Notes in Computer Science*, vol. 507, pp. 412-418, 1991.
10. "Towards a better algorithm for wave propagation on distributed memory machines," (with Naresh Nayar, D. K. Hoffman, D. J. Kouri, and John Gustafson), *Parallel Computing '91*, Elsevier Science Publishers, pp. 241-249, 1992.
11. "Myths of load balancing," (with Milton Wikstrom and John Gustafson), *Parallel Computing '91*, Elsevier Science Publishers, pp. 531-549, 1992.

12. "Random number generation for parallel computers," (with Srinivas Aluru), *NATO ASI Series, Computer and System Sciences*, vol. 103, Springer Verlag, pp. 315-320, 1993.
13. "A random number generator for parallel computers," (with Srinivas Aluru and John Gustafson), *Parallel Computing*, 18, pp. 839-847, 1992.
14. "A framework for business transformation," (with Sree Nilakanta and Ashok Subramanian), *Journal of Microcomputer Applications*, vol. 17, No. 1, pp. 1-7, 1998.
15. "Distribution-independent hierarchical algorithms for the N-body problem," (with Srinivas Aluru, John Gustafson, and Fatih Sevilgen), *Journal of Supercomputing*, 12, pp. 303-323, 1998.
16. "Programming is writing: why programs must be carefully evaluated," (with Gary Leavens, Albert Baker, Vasant Honavar, and Steve LaValle), *Journal of Mathematics and Computer Education*, vol. 32, No. 3, pp. 284-295, 1998.
17. "Reversal in the time order of interactive events: collision of inclined rods," (with Chandru Iyer), *Eur. J. Phys.* **27** (4), pp. 819-824, 2006.
18. "Differing observations on the landing of the rod into the slot," (with Chandru Iyer), *Am. J. Phys.* **74** (11), pp. 998-1001, 2006.
19. "Lorentz transformations with arbitrary line of motion," (with Chandru Iyer), *Eur. J. Phys.* **28** (2), pp. 183-190, 2007.
20. "Optimization rules in DLV for the bridge crossing problem," (with Sayan Ranu and P. Balakrishnan), *Journal of Engineering, Computing and Architecture*, **1** (1), pp. 1-15, 2007.
21. "A variation of the clock paradox and a distinguishing feature of an inertial frame," (with Chandru Iyer), *Journal of Physical and Natural Sciences*, **1** (1), pp. 1-8, 2007.
22. "Reply to comment on 'Lorentz transformations with arbitrary line of motion,'" (with Chandru Iyer), *Eur. J. Phys.* **28** (3), pp. L15-L16, 2007.
23. "Design of Semantic Bridge: A generalized web service providing programmable access to distributed heterogeneous data," (with Prabhakar Balakrishnan), *Journal of Engineering, Computing and Architecture*, **1** (2), pp. 1-12, 2007.
24. "Composition of two Lorentz boosts through spatial and space-time rotations," (with Chandru Iyer), *Journal of Physical and Natural Sciences*, **1** (2), pp. 1-8, 2007.

25. "Implementation of Semantic Bridge: Providing Programmable Access to Distributed Heterogeneous Data," (with Prabhakar Balakrishnan), *Journal of Computer Science, Informatics & Electrical Engineering*, **2** (1), pp. 1-14, 2008.
26. "A constructive formulation of the one-way speed of light," (with Chandru Iyer), Accepted in *American Journal of Physics*, Nov. 2009.

### **Journal Papers Submitted/Under preparation**

27. "Synchronizing equivalent clocks across inertial frames," (with Chandru Iyer), submitted to *Journal of Physical and Natural Sciences*, Sept 2008.
28. "Evolving Graph Representation and Visualization," (with A. Chapanond, M. S. Krishnamoorthy, and J. R. Punin), submitted to *Journal of Computer Science, Informatics, and Electrical Engineering*, August 2009.

### **Refereed Conferences**

29. "Regular graph isomorphism and regular-bipartite graph isomorphism are ISO-complete," (with M. S. Krishnamoorthy), Conference on Information Sciences and Systems, Johns Hopkins University, pp. 183-186, 1981.
30. "A parallel algorithm for searching completely ordered sets," (with S. Venkataraman and J. A. Davis), Third International Conference on Supercomputing, pp. 510-512, 1988.
31. "Characterizing the performance of concurrent computers: A picture is worth a thousand numbers," (with Diane Rover and Charles Wright), Fourth Conference on Hypercubes, Concurrent Computers and Applications, pp. 245-248, 1989.
32. "Divide-and-conquer algorithms for multiprocessors," (with Lakshman Mukkavilli and Charles Wright), Fourth Conference on Hypercubes, Concurrent Computers, and Applications, pp. 421-424, 1989.
33. "Implementing graph algorithms on multiprocessors," (with Naresh Nayar and Charles Wright), Fourth Conference on Hypercubes, Concurrent Computers and Applications, pp. 425-428, 1989.
34. "Knowledge-based graph theoretic analysis of data flow diagrams: integrating CASE tools with expert systems," (with Sree Nilakanta and R. Wemhoff), ACM SIGBDP conference on Trends and Directions in Expert Systems, pp. 58-71, 1990.
35. "A threshold test for dynamic load balancers," (with Milton Wikstrom and John Gustafson), pp. 268-269, 1991.

36. "An expert system for product substitution," (with R. Wemhoff, Sree Nilakanta, and Manish Acharya), First World Congress on Expert Systems, pp. 2382-2387, 1991.
37. "Symbolic analysis on an Ncube multiprocessor machine," (with Marwan Hassoun and Prakash Atawale), Proceedings of the 1992 International Workshop on Symbolic Methods and Applications to circuit design, Florence, Italy, pp. 185-198, 1992.
38. "Enterprise-wide management: a paradigm for constructing organizational decision support systems," (with Robert Whitehair, Sree Nilakanta, and Ian Campbell), 26<sup>th</sup> Hawaii International Conference on System Sciences, Maui, Hawaii, pp. 669-676, 1993.
39. "A decision tree algorithm for incremental batch learning," (with Babak Forouraghi and Les Schmerr), Second World Congress on Expert Systems, Lisbon, Portugal, pp. 830-842, 1994.
40. "Reduced enterprise architecture paradigm: a framework for quantitative assessment," (with Sree Nilakanta), First International Conference of Pacific Research Institute for Information Systems and Management, Maui, Hawaii, pp. 113-118, 1994.
41. "A framework for business transformation," (with Sree Nilakanta and Ashok Subramanian), First International Conference on Intelligent Information Management Systems, pp. 72-76, 1994.
42. "Fuzzy multiobjective optimization with multivariate regression trees," (with Babak Forouraghi and Les Schmerr), Third International Conference on Fuzzy Systems, pp. 1400-1405, 1994.
43. "Induction of multivariate regression trees for design optimization," (with Babak Forouraghi and Les Schmerr), Twelfth AAAI National Conference on Artificial Intelligence, pp. 607-612, 1994.
44. "A methodology for business transformation," (with Sree Nilakanata and Ashok Subramanian), Third International Conference on Systems Integration, Sao Paulo, Brazil, pp. 403-411, 1994.
45. "Truly distribution-independent algorithms for the N-body problem," (with Srinivas Aluru and John Gustafson), Supercomputing 94, pp. 420-428, 1994.
46. "Technology imperatives of BPR and their effect on organization decision support systems," (with Sam Iliiafar, Sree Nilakanta, and Ashok Subramanian), 28<sup>th</sup> Hawaii International Conference on System Sciences, pp. 941-946, 1995.

47. "Learning materials performance knowledge from materials property databases," (with Babak Forouraghi and Les Schmerr), Second International Conference on Intelligent Information Management Systems, pp. 17-20, 1995.
48. "Parallelizing a very high resolution climate model using clusters of workstations with PVM and performance and load balance analyses," (with Hao Wang and Eugene Takle), International Conference on Parallel and Distributed Processing Techniques and Applications, pp. 1762-1767, CSREA Press, 1998.
49. "Implementation and performance evaluation for a computation-intensive climate simulation application," (with Hao Wang, Eugene Takle, and Rajat Todi), ParCo99 International Conference on Parallel Computing, Netherlands, 1999.
50. "Evaluation of file access patterns using realistic I/O workloads for a cluster environment," (with Rajat Todi, Yuri Alexeev and John Gustafson), ParCo99 International Conference on Parallel Computing, Netherlands, 1999.
51. "Performance evaluation of climate simulation on a cluster of networked workstations," (with Hao Wang, Eugene Takle, and J. M. Shen), International Conference on Parallel and Distributed Processing Techniques and Applications, pp. 2007-2013, CSREA Press, 2000.
52. "Programmable access to distributed data: Design of Semantic Bridge," (with Prabhakar Balakrishnan), 2<sup>nd</sup> IASTED International Conference on Communications, Internet, and Information Technology, Scottsdale, Arizona, pp. 589-594, 2003.

### **Juried Publications**

53. "A parallel computer implementation of power system transient stability assessment," (with Vijay Vittal and Swee Lim), IEEE Power Engineering Society Meeting, 1990.
54. "An enhancer for dynamic load balancers," (with Milton Wikstrom and John Gustafson), Parallel Computing, 1991.
55. "Teaching parallel computing to high school students," (with Charles Wright), Synthesis Coalition Workshop, Berkeley, 1993.
56. "The use of IDEF methods within a framework for business transformation," IDEF Users Group Conference, 1994.
57. "The use of microcontrollers in Mechatronics education," (with Charles Wright), Workshop on Mechatronics Education, Stanford, 1994.

58. "Enterprise Integration: Art or Science?" The Society for Enterprise Engineering, 1995.

### **Technical Reports**

59. "Optimization rules in DLV for the bridge crossing problem," (with Sayan Ranu and Prabhakar Balakrishnan), Technical Report 06-08, Dept. of Computer Science, ISU, April 2006.
60. "The twin paradox," (with Chandru Iyer), Technical Report 06-23, Dept. of Computer Science, ISU, August 2006.
61. "Constructive derivation of asynchronicity," (with Chandru Iyer), Technical Report 06-24, Dept. of Computer Science, ISU, August 2006.
62. "Lorentz transformations with arbitrary line of motion," (with Chandru Iyer), Technical Report 06-25, Dept. of Computer Science, ISU, August 2006.
63. "Clock synchronization with a 3-clock system," (with Chandru Iyer), Technical Report 06-26, Dept. of Computer Science, ISU, August 2006.
64. "The twin paradox with unequal onward and return velocities," (with Chandru Iyer), Technical Report 06-27, Dept. of Computer Science, ISU, August 2006.
65. "Generalized relativistic velocity addition in two-dimensional space," (with Chandru Iyer), Technical Report 06-37, Dept. of Computer Science, ISU, January 2007.
66. "A study of arbitrary sequences of planar rotations and conventional Lorentz transformations in two-dimensional space," (with Chandru Iyer), Technical Report 07-03, Dept. of Computer Science, ISU, March 2007.
67. "A constructive derivation of the one-way speed of light," (with Chandru Iyer), Technical Report 08-08, Dept. of Computer Science, ISU, August 2008.
68. "The one-way speed of light: a simple formulation," (with Chandru Iyer), Technical Report 08-09, Dept. of Computer Science, ISU, August 2008.
69. "Relative motion and the speed of light," (with Chandru Iyer), Technical Report 08-10, Dept. of Computer Science, ISU, August 2008.

### **Books**

Introduction to Computer Architecture and Machine-Level Programming (with Charles Wright), Published by Scott/Jones Inc., 1994.

## **Computer Architecture Tutorial**

In the course of teaching and developing Com S 321, I developed a hands-on Java-based interactive tutorial located at [www.cs.iastate.edu/~prabhu/Tutorial/title.html](http://www.cs.iastate.edu/~prabhu/Tutorial/title.html) that is very popular with students as well as with engineers who work in industry. Several users have written to me about how useful they found the material in the tutorial.

## **GRADUATE STUDENT SUPERVISION (details appear in Appendix A below)**

Doctoral (Major Professor): 7

Doctoral POS Committees: 42

Masters (Major Professor): 30

Masters POS Committees: 114

Total Program of Study Committees: 193

## **EXTERNAL FUNDING**

1. Parallel algorithms for dynamic security assessment of large power systems (co-PI with Aziz Fouad and Vijay Vittal). National Science Foundation. 1988. Amount: \$30,000.
2. Design of a vector processor (co-PI with Glenn Luecke). NASA Ames Research Center. 1989. Amount: \$32,000.
3. Innovative information technology solutions for distribution. Next Generation Management Systems. 1990 - 1992. Amount: \$284,070.
4. A laboratory to support computer-aided digital systems design (co-PI). National Science Foundation. 1990 - 1992. Amount: \$218,317.
5. Laboratory equipment to enhance VLSI education (co-PI). Hewlett Packard. 1996. Amount: \$215,000.

## **Funding opportunities**

Funding sources for my current research projects match well with the objectives of NSF's IIS division, especially Science and Engineering Information Integration and Informatics (SE I + II). Other sources are from companies such as IBM and Intel that are developing blueprints for autonomic computing and proactive computing.

## **Recent Proposals**

1. Co-PI on NSF Proposal (2008). Title: New GK12: Incorporating Computational Approaches into High School Biological Sciences Curricula. Amount: \$2,839,725. Denied.
2. PI on Bailey Grant proposal (internal): Design of Semantic Bridge. Amount \$50,000. Submitted March 2006. Denied.

3. Co-PI on DOE GAANN (Graduate Assistantships in Areas of National Need): Information Technology and its Applications (2004). Amount: \$538,892. Scored 94 points out of 100 but was the highest one to be denied.
4. PI on NSF ITR (2003). Title: Programmable Access to Heterogeneous Distributed Data. Amount: \$499,768. Competitive but denied.

## **Reviewer For**

### **Journals**

1. IEEE Transactions on Parallel and Distributed Systems
2. IEEE Transactions on Computers
3. IBM Systems Journal
4. Journal of Parallel and Distributed Computing
5. Parallel Computing (Journal)
6. ACM Transactions on Mathematical Software
7. International Journal on Microcomputer Applications
8. ETRI (Research Journal of Korean Academy of Sciences)
9. Journal of Indian Institute of Science
10. Journal of Supercomputing
11. IEEE Transactions of Reliability
12. Journal of Computer and System Sciences

### **Conferences**

1. International Conference on Parallel Processing
2. International Parallel Processing Symposium
3. World Congress on Expert Systems
4. Hawaii International Conference on System Sciences
5. Conference on Hypercubes, Concurrent Computers and Applications
6. International Conference on Intelligent Information Management Systems
7. Supercomputing Conference
8. AAAI National Conference on Artificial Intelligence
9. Engineering Synthesis Coalition
10. Session Chair: John Vincent Atanasoff Symposium, 2003
11. Session Chair: IASTED Conference (CIIT), 2003

### **Editorial Service**

1. Publication Chair, 2005 IEEE International Conference on Services Computing
2. Senior Editor: PiTech (Pan IIT Tech Review, 2005 – 2007)

### **Funding Agencies**

1. National Science Foundation
2. DARPA

## TEACHING STATEMENT

### Teaching Philosophy

Teaching at the graduate and undergraduate levels is one of the responsibilities I enjoy most and carry out very well. My goal as an instructor is to present relevant material as clearly as possible. Over the years I have learned not to rush through my syllabus simply to cover all the topics. Instead, I focus on the learning outcomes, handling student difficulties by asking questions and waiting for questions to be asked, and assigning numerous in-class activities to make sure that the fundamental concepts are well understood.

I teach primarily through a hands-on approach. Not with a view to disseminate what I know, but with a view to help students learn the concepts well. As their instructor I facilitate student learning by offering alternative methods in the classroom. Most students in computer science and computer engineering learn more by doing hands-on activities rather than a classroom format. Consequently much of my efforts in the courses I teach are directed towards the development of hands-on laboratory or recitation experiences that are tightly integrated with the lectures. Before testing the students, I expose them to concepts three times: once in the lecture via examples, a second time via pencil and paper exercises, and a third time via a laboratory or programming project. I have successfully used this paradigm in both undergraduate and graduate courses. The innovation is in the pedagogy, which facilitates student learning. This paradigm was also integrated into the textbook I wrote on assembly language and computer architecture. I help students achieve their goals by providing them with the skills they need and the opportunities to practice those skills.

In 1994 I was put in charge of the undergraduate curriculum in our department. Since that time I have primarily focused my attention on instruction and computing laboratories for course development. Together with Professor Charles Wright, I wrote several successful proposals for instructional equipment. The computer science department was pressed for space (and still is) and so these proposals all went through computer engineering. We decided this was the best way to benefit students in both computer science and computer engineering.

For many years, I was in charge of teaching the frontier courses in our discipline. Teaching at the freshman level poses challenges not encountered at the higher levels due to the diversity of students' backgrounds, the sheer size of the lecture sections (in excess of 150 students), and the administrative demands placed on the instructor. The motivation I have provided for students to stay in our discipline and the enthusiasm they have shown has been the reward for this effort. There has also been the benefit of learning new technologies for lecturing and course management. These include the use of computer demonstrations of programming concepts, computer-assisted homework submissions and grading, and the dissemination of course material through the World Wide Web, especially a web-based tutorial on computer architecture that is widely used by students and engineers in industry.

In the senior-level undergraduate and graduate courses, besides providing students with the professional and research skills, I emphasize communication skills through oral presentations and written reports for class sizes that are relatively small (about 20 to 30). I teach students that learning to disseminate their ideas through oral and written means is the key to success in almost all employment areas.

I have always stepped in for the department and developed and taught many courses that were not in my immediate area of research. I have developed 19 courses during the last 21 years. Many of the courses had to be developed from scratch. It has been my belief that anyone with a Ph.D. in computer science ought to be able to teach any course at the undergraduate level with some effort. As for graduate courses, it takes a lot more effort but I have done that as well. Unusual circumstances in our department and a sudden exodus of faculty in the mid 1980s forced our department to make adjustments and I volunteered to step in and meet the challenge.

### **Courses Taught**

Courses taught at the undergraduate level include beginning programming, discrete mathematics, design and analysis of algorithms, assembly language and computer architecture, operating systems, programming languages, and parallel computing. Courses taught at the graduate level include high-performance computing, computer architecture, artificial intelligence, and theory. In addition I have also taught graduate seminar courses.

### **Courses Developed (details in Appendix B)**

A list of courses developed and taught is included in Appendix B below.

### **Course Evaluations (details in Appendix B)**

Evaluations and feedback received from students indicate that my teaching is considered excellent. Compared to departmental peer teaching, my ratings are above average. A comment frequently made is that “he’s one of the best instructors I’ve had at ISU.”

Data and student comments on my teaching are provided in a Teaching Evaluation table in Appendix B. The departmental student evaluation forms have changed over the years. From 1983 to Summer 1996, we used a form that evaluated several criteria but no overall rating. The criterion reported in the summary table is for explanation of material. Between Fall 1996 and Fall 1998, the department used a form with an overall instructor rating and an overall course rating. From Spring 1999 onwards, our evaluation form reversed the scale used for overall instructor and overall course.

## **Mentoring**

I have actively participated in mentoring high school students and beginning undergraduate students in the Women in Science and Engineering Program (WSE) and Research Careers for Minority Scholars (RCMS) Program held at Iowa State during the summers. This activity was done jointly with the late Prof. Charles Wright.

Each student spent between 6 to 8 weeks working every day in the summer. We conducted formal classes in the mornings, explaining aspects of computers, programming in C/C++, and application software in the Mac Lab in Coover Hall. In the afternoons we conducted laboratory sessions to reinforce the concepts taught. Each student had to eventually work on a major project that culminated in a written report and a Poster presentation at the end of the internship.

Depending on the strengths and interests of the students, our approach was to prepare a custom training program for each student so that they got the most out of their internship experience and hopefully the motivation to pursue baccalaureate and masters degrees. This took up a lot more of our time but we felt that the rewards were worth the effort we put into it.

The WSE internship was coordinated by Mary Ann Evans and the RCMS internship was coordinated by Loren Zachary. The names of students I mentored are listed below:

### **Summer 1993**

Corine Hegland	WSE
Jolynne Roorda	WSE
Kris Fretz	WSE
Stacy Pschenica	WSE

William Ortega	RCMS
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### **Summer 1994**

Jennifer Cho	WSE
Julee Dunekacke	WSE
Andrea Dekoter	WSE
Lea Boldt	WSE
Gretchen Vogel	WSE

Ana Torres	RCMS
Lew Hill	RCMS

### **Summer 1995**

Brooke Nixon	WSE
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Alison Smith           WSE  
Kelly Wisebrod        WSE

Jana Navratilova      Student from Czech Republic admitted by Elizabeth Hoffman  
Hana Smidova         Student from Czech Republic admitted by Elizabeth Hoffman

(Jana and Hana had poor knowledge of English and we had to arrange several break-out sessions tailored specifically for them.)

Lew Hill                RCMS (who also assisted us with the WSE mentees) who continued as a mentee in Fall 1995 and Spring 1996. Lew went on to complete a Masters and Ph.D at Iowa State University.

**Summer 1996**

Michelle Aiken        WSE  
Jennifer Remmers     WSE  
Julie Reed             WSE

**Summer 1997**

Jennifer Broussard    WSE  
Robin Li               WSE

Krishna Rao           High school student from St. Paul, Minnesota (Harvard graduate)

**Summer 1999**

Eknath Vittal         High school student, University of Illinois, Urbana graduate

**2002-03**

PFF (Preparing Future Faculty) Mentor to Jun Zhang

**2003-04** Faculty mentor to Dirk Reiners

## **ADMINISTRATION**

### **Chair of Undergraduate Committee**

Since 1994 I was put in charge of the Undergraduate committee in the department. Unlike other committees I have served on, this role has placed a heavy demand on my time in course development and course administration activities. It has resulted in taking time away from my research program. I have continued to direct Masters and doctoral students, and publish papers in conferences and journals but have not had the time to pursue proposal writing. In this section I have listed many things that I do to run our undergraduate program. Many of these activities virtually constitute the role played by an associate chair in many departments. Some of these activities include:

- Preparing and getting approved the Pre-Major program by the Faculty Senate
- Developing and monitoring student outcomes assessments
- Developing several undergraduate courses and keeping them current
- Talking to recruiters
- Reviewing and changing the catalog
- Establishing a process for evaluating transfer credit
- Administering Test-outs for our CS-1 and CS-2 courses
- Visiting with potential students and their parents including National Merit Scholars
- Working with our advisors in handling students with special circumstances

### **ABET Coordinator**

In Fall 1998 I was named as the coordinator for the department's Accreditation. Largely due to my efforts, we continue to be accredited. I have experience in the guidelines and standards used by both the Computing Sciences Accreditation Board (CSAB) as well as the Accreditation Board for Engineering and Technology (ABET). I am serving on the LAS College Dean's committee to help develop learning outcomes and assessments in preparation for the North Central Accreditation of the university in Spring 2006.

### **Associate Chair**

In 2002-03 I was the Associate Chair of the department. I gained considerable administrative experience in running and administering the department. My goal as an administrator is to be a facilitator for overall productivity of the department as a whole, recognizing that the sum of the parts is always better than the individual parts by themselves. I encourage team teaching, course breaks for faculty involved in large institutional proposals and provide incentives for faculty engaged in collaborative research activities.

## **Committee and Community Service**

### **1983-84**

Member, Equipment Committee

### **1984-85**

Member, Equipment Committee

### **1985-86**

Member, Equipment Committee

Graduate Recruitment trips

### **1986-87**

Member, Graduate Committee

Member, Faculty Search Committee

### **1987-88**

Member, Graduate Admissions Committee

Graduate Recruitment trips

### **1988-89**

Chair, Graduate Admissions Committee

Chair, Ad Hoc Committee on Governance Document

Member, Ad Hoc EE/CprE Program Review Committee

Graduate Recruitment trips

### **1989-90**

Chair, Graduate Admissions Committee

Faculty Advisor, University-wide AI Group

Coordinate research activity

Serve as a consulting body for problems encountered in applied areas

Help research groups to build expert systems

### **1990-91**

Chair, Graduate Admissions Committee

Member, Graduate Committee

Member, Promotion & Tenure Steering Committee

### **1991-92**

Chair, Graduate Committee

Made major changes to the process of qualifying students for the Ph.D. program

**1992-93**

Member, Graduate Committee

**1993-94**

Faculty Improvement Leave

**1994-95**

Chair, Undergraduate Committee

Developed and taught a course on Scheme in 227

Judged projects for Adventures in Supercomputing

**1995-96**

Chair, Undergraduate Committee

Made major changes to the UG curriculum

Member, Promotion and Tenure Steering Committee

Developed a proposal to change 227 from Scheme to C++

Worked on Catalog changes

Judged projects for Adventures in Supercomputing

**1996-97**

Chair, Undergraduate Committee

Member, Promotion & Tenure Steering Committee

Participated in Industry Day

Co-taught and co-developed 227 in C++ with Albert Baker

Judged projects for Adventures in Supercomputing

**1997-98**

Chair, Undergraduate Committee

Developed and administered Placement Test for 227 (Fall and Spring)

Developed 227 and 228 in C++

Worked on Catalog changes

Judged projects for Adventures in Supercomputing

Departmental Liaison for NUST (National Universities of Science and Technology)

**1998-99**

Chair, Undergraduate Committee

Developed a proposal for a Pre-Major program in Com S

Administered Placement Test for 227 (Fall and Spring)

Judged projects for Adventures in Supercomputing

Departmental Liaison for NUST (National Universities of Science and Technology)

**1999-00**

Chair, Undergraduate Committee  
Administered Placement Test for 227 (Fall and Spring)  
Course Coordinator for 227 and 228  
Departmental Coordinator for Accreditation Review  
    Prepared Accreditation self study  
Worked on Catalog changes  
Judged projects for Adventures in Supercomputing  
Departmental Liaison for NUST (National Universities of Science and Technology)

**2000-01**

Chair, Undergraduate Committee  
Administered Placement Test for 227 (Fall and Spring)  
Course Coordinator for 227 and 228  
Judged projects for Adventures in Supercomputing  
Departmental Liaison for NUST (National Universities of Science and Technology)  
Departmental Coordinator for Accreditation  
    Administered the Accreditation Visit by CSAB  
    Developed new set of outcomes and assessment measures  
    Prepared the response to CSAB Preliminary statement

**2001-02**

Chair, Undergraduate Committee  
Member, Promotion and Tenure Steering Committee  
Departmental Coordinator for Accreditation  
    Prepared the response to CSAB Final statement  
Member, LASCOLA (LAS Committee on Learning Assessment)  
Worked on Catalog changes  
Departmental Liaison for NUST (National Universities of Science and Technology)

**2002-03**

Associate Chair of department  
Member, Undergraduate Committee  
Chair, Grievance Committee  
Departmental Coordinator for Accreditation  
    Prepared Accreditation response for Board of Regents Meeting  
    Prepared Accreditation self study  
Member, LASCOLA

**2003-04**

Chair, Undergraduate Committee

Approved a proposal to switch from C++ to Java  
Member, Grievance Committee  
Member, Adhoc Com S/ECE Curriculum Committee  
Departmental Coordinator for Accreditation  
Administered Accreditation Visit by ABET  
Assisted in preparing response to Preliminary Statement  
Member, LASCOLA  
Worked on Catalog changes

#### **2004-05**

Chair, Undergraduate Committee  
Worked on requirements for a Software Engineering Degree Program  
Member, Grievance Committee  
Member, DEO Evaluation Steering Committee  
Departmental Coordinator for ABET  
Assisted in preparing response to Final Statement  
Chair, Outcomes Assessment Subcommittee  
Posted departmental program outcomes on Web page  
Posted departmental assessment measures on Web page  
Facilitated dissemination of learning outcomes to students via course syllabi  
Member, LASCOLA

#### **2005-06**

Chair, Undergraduate Committee  
Working on requirements for a Bioinformatics Degree Program  
Member, Grievance Committee  
Member, Web Advisory Committee  
Departmental Coordinator for ABET  
Submitted Interim Report and obtained extended accreditation till 2009  
Chair, Outcomes Assessment Committee  
Posted departmental program outcomes on Web page  
Posted departmental assessment measures on Web page  
Posted curriculum improvements made over last 10 years on Web page  
Facilitated dissemination of learning outcomes to students via course syllabi  
Member, LASCOLA  
Departmental Coordinator for university-wide Accreditation by NCA in March 2006  
Worked on Catalog Changes

#### **2006-07**

Chair, Undergraduate Committee  
Member, Grievance Committee  
Member, Promotion and Tenure Steering Committee  
Departmental Coordinator for ABET  
Member, LASCOLA

**2007-08**

Chair, Undergraduate Committee  
Member, Grievance Committee  
Member, Promotion and Tenure Committee  
Departmental Coordinator for ABET  
Member, LASCOLA  
Member, Ad Hoc Committee for Updating Governance Document  
Worked on Catalog Changes

**2008-09**

Chair, Undergraduate Committee  
Member, Grievance Committee  
Member, Promotion and Tenure Committee  
Departmental Coordinator for ABET: Preparing self-study for 2009 visit  
Member, LASCOLA  
Member, Ad Hoc Committee for Web Management

**2009-10**

Chair, Undergraduate Committee  
Departmental Coordinator for ABET Accreditation of Computer Science  
Departmental Coordinator for ABET Accreditation of Software Engineering  
LAS College representative on Graduate Curriculum Committee  
Member, Promotion and Tenure Steering Committee  
Member, Promotion and Tenure Committee  
Member, Grievance Committee  
Member, LASCOLA

## APPENDIX A: GRADUATE RESEARCH SUPERVISION

### PhD Students Directed: Major Professor

	Name of Student	Field / Date Completed	Status
1.	Lakshman Kumar Mukkavilli	Com S / 1990	Senior Technical Leader, CISCO Systems
2.	Milton Wikstrom	Com S / 1991	Program Manager, John Deere
3.	Naresh Nayar	Com S / 1992	Senior Software Engineer, IBM, Rochester
4.	Srinivas Aluru	Com S / 1994	Tenured Professor, ECE, ISU
5.	Babak Forouraghi	Com S / 1995	Tenured Associate Professor, St. Joseph's University
6.	Hao Wang	Com S / 2001	Project Leader, IBM, Rochester
7.	Rajat Todi	Com S / 2003	Design Engineer VLSI, Hewlett Packard

### Masters Students Directed: Major Professor

	Name of student	Field	Year Graduated	Position on Committee
1.	Colen Willis	Com S	1985	Major Prof.
2.	Nune Durgaprasad	Com S	1986	Major Prof.
3.	Milton Wikstrom	Com S	1988	Major Prof.
4.	Sunil Bhat	Com S	1989	Major Prof.
5.	Ronald Deng	Com S	1989	Major Prof.
6.	James Wright	Com S	1989	Major Prof.
7.	Jihoon Yang	Com S	1989	Major Prof.
8.	Pankaj Narayan	Com S	1990	Major Prof.
9.	Hari Vasudev	Com S	1990	Major Prof.
10.	Srinivas Aluru	Com S	1991	Major Prof.
11.	Subbalakshmi Mukkavilli	Com S	1991	Major Prof.
12.	Babak Forouraghi	Com S	1991	Major Prof.
13.	Ilango Krishnamurthi	Com S	1993	Major Prof.
14.	Venu Padakanti	Com S	1994	Major Prof.
15.	Hao Wang	Com S	1998	Major Prof.
16.	Marina Sokolova	Com S	1998	Major Prof.
17.	Jen-Yao Hsu	Com S	1998	Major Prof.
18.	Nitin Gupta	Com S	1999	Major Prof.
19.	Shaukat Mahmood	Com S	2000	Major Prof.
20.	Bogdan Vasiliu	Com S	2000	Major Prof.
21.	Ying Li	App Math	2000	Major Prof.
22.	Wei-Hua Lin	Com S	2000	Major Prof.
23.	Gazala Khan	Com S	2000	Major Prof.
24.	Abira Masood	Com S	2000	Major Prof.
25.	Hua Chen	Com S	2001	Major Prof.
26.	Nishikanth Gaddam	Com S	2001	Major Prof.

27.	Prasad Porouri	Com S	2001	Major Prof.
28.	Elango Krishnakumar	Com S	2001	Major Prof.
29.	Yanqui Wang	Com S	2001	Major Prof.
30.	Silvia Spanoyannis	Com S	2001	Major Prof.

### Ph.D Students: Membership in Program of Study Committees

	Name of Student	Field	Year Graduated	Position on Committee
1.	James Davis	Com S	1984	Member
2.	Deborah Knox	CprE	1987	Member
3.	Ta-Wen Lin	Com S	1987	Member
4.	Kanad Ghose	Com S	1988	Member
5.	John Leuchner	Com S	1988	Member
6.	Craig Rich	Com S	1988	Member
7.	Okan Zabunoglu	Nuc Eng	1988	Member
8.	Gautam Bhargava	Com S	1989	Member
9.	Pong Ping Chu	CprE	1989	Member
10.	Geeju Moon	EE	1989	Member
11.	Diane Rover	CprE	1989	Member
12.	Michael Carley	Stat	1990	Member
13.	Pranava Jha	Com S	1990	Member
14.	Ramin Mikaili	Nuc Eng	1990	Member
15.	Samir Moukadam	Com S	1990	Member
16.	S. Venkataraman	CprE	1990	Member
17.	Serhat Alten	Nuc Eng	1992	Member
18.	Jang-Kyung Kim	CprE	1992	Member
19.	Anand Medepalli	Math	1992	Member
20.	Michael Carter	CprE	1993	Member
21.	Sunil Nair	Com S	1993	Member
22.	Jeff Clary	Com S	1994	Member
23.	Jungsun Kim	CprE	1994	Member
24.	Jim Van Peurse	CprE	1994	Member
25.	Mark Fienup	Com S	1995	Member
26.	Simanta Mitra	Com S	1997	Member
27.	Quinn Snell	Com S	1997	Member
28.	Naresh Maheshwari	CprE	1998	Member
29.	Russell Meier	CprE	1998	Member
30.	Jinmei Shen	Meteor	1999	Member
31.	Jihoon Yang	Com S	1999	Member

32.	Changjiu Dang	EM	2001	Minor Rep.
33.	Ahmed Younis	CprE	2001	Member
34.	Laura Arns	Com S	2002	Member
35.	Lili Ju	Math	2002	Minor Rep.
36.	Kuk-Jin Lee	CprE	2006	Member
37.	Lewis Hill	HCI	2006	Member (2003)
38.	Matthew Patitz	Com S	Pending	Member (2008)
39.	Yuheng Long	Com S	Pending	Member (2009)
40.	Viswanath Krishnamurthy	Com S	Pending	Member (2009)
41.	Nathan Weeks	Com S	Pending	Member (2009)
42.	Chad Brewbaker	ECE	Pending	Member (2008)

### **Masters Students: Membership in Program of Study Committees**

	<b>Name of Student</b>	<b>Field</b>	<b>Year Graduated</b>	<b>Position on Committee</b>
1.	Youh Lin	EVAL	1986	Member
2.	Shu-Hwa Liu	Com S	1986	Member
3.	Rajesh Gulati	Com S	1987	Member
4.	Uday Hegde	Com S	1987	Member
5.	Anita Jhunjhunwala	Com S	1987	Member
6.	Gopal Miglani	Com S	1987	Member
7.	Raj Nair	Com S	1987	Member
8.	S. Venkataraman	CprE	1987	Minor Rep.
9.	William Armstrong	EE	1988	Member
10.	Sunil Chitgopekar	Appl Math	1988	Member
11.	Ken Christensen	Com S	1988	Member
12.	Peter Cyr	IE	1988	Member
13.	Kelvin Fedrick	Com S	1988	Member
14.	Seshadri Guha	ME	1988	Member
15.	H. S. Hsueh	Math	1988	Member
16.	Russ Jorgensen	Com S	1988	Member
17.	Shivanand Shenoy	Appl Math	1988	Member
18.	Laura Smith	Math	1988	Member
19.	Sethuraman Subramanian	Com S	1988	Member
20.	Chi-Heng Cheng	Com S	1989	Member
21.	Stanley Hansen	Com S	1989	Member
22.	Swee-Lian Lim	EE	1989	Member
23.	Khaled Dib	IMSE	1990	Member

24.	Ilga Higbee	Com S	1990	Member
25.	Subrata Mukherjee	Com S	1990	Member
26.	David Richter	EE	1990	Member
27.	Michael Ament	CprE	1991	Member
28.	Suresh Gopalratnam	CprE	1991	Member
29.	Kai-Ming Lee	Com S	1991	Member
30.	Wasef Masri	CprE	1991	Member
31.	Richard Jamroack	CprE	1992	Member
32.	Trevor Meyer	CprE	1992	Member
33.	Daniel Olsen	CprE	1992	Member
34.	Hau Duc Trinh	CprE	1992	Member
35.	Prakash Atwale	CprE	1993	Member
36.	Imtiaz Bhatia	CprE	1993	Member
37.	Todd Greenfield	CprE	1993	Member
38.	John Hartogh	CprE	1993	Member
39.	Piyush Sancheti	CprE	1993	Member
40.	Lois Thur	Math	1993	Member
41.	Daniel Wood	CprE	1993	Member
42.	John Alexander	CprE	1994	Member
43.	James Marek	CprE	1994	Member
44.	Russell Meier	CprE	1994	Member
45.	Paul Seeber	CprE	1994	Member
46.	Corey Stohs	CprE	1994	Member
47.	James Zelle	CprE	1994	Member
48.	Archana Jain	CprE	1995	Member
49.	Archana Arkanath	CprE	1996	Member
50.	Robert Bowen	CprE	1996	Member
51.	Youngtae Kim	Com S	1996	Member
52.	Sunil Shaligram	CprE	1996	Member
53.	Bruce Tweeton	CprE	1996	Member
54.	Yan-Zhe Wang	Com S	1996	Member
55.	Barry Williams	CprE	1996	Member
56.	Sandra Bowersox	CprE	1997	Member
57.	Scott Bruner	CprE	1997	Member
58.	David Culbertson	Sys E	1997	Member
59.	Kiran Dasoju	CprE	1997	Member
60.	Gaurav Gupta	CprE	1997	Member
61.	Geir Halingstad	CprE	1997	Member
62.	Christy Krause	CprE	1997	Member
63.	Matthew Poellet	CprE	1997	Member
64.	Tapas Ray	EE	1997	Member
65.	James Sabin	CprE	1997	Member
66.	Seshadri Anantharaman	CprE	1998	Member
67.	Axel Bull	CprE	1998	Member
68.	Xiangdong Li	CprE	1998	Member

69.	Jinmei Shen	Meteor	1998	Member
70.	Lars Sunde	CprE	1998	Member
71.	Zhuo Yang	CprE	1998	Member
72.	Xionghei Zhou	ME	1998	Member
73.	Zhaobin Zhou	CprE	1998	Member
74.	Haroon Rashid Khan	EE	1999	Member
75.	Amy Nowakowski	CprE	1999	Member
76.	Venkata Sama	CprE	1999	Member
77.	Manoj Sahu	CprE	1999	Member
78.	Kae Wong	EE	1999	Member
79.	Zhenglu Wu	AER E	1999	Minor Rep.
80.	Khaldoun Bataineh	CprE	2000	Member
81.	Jinyuan Chen	CprE	2000	Member
82.	Lewelyn D'Souza	CprE	2000	Member
83.	Ying Li	Com S	2000	Member
84.	Joel Nickel	CprE	2000	Member
85.	Satish Rajagopalan	EE	2000	Member
86.	Vijaya Rentala	EE	2000	Member
87.	Zulfiqar Sarosh	CprE	2000	Member
88.	Xiaoyong Zhang	BUS	2000	Minor Rep.
89.	Praveen Codambakkam	Com S	2001	Member
90.	Justin Gaither	CprE	2001 (Grad 2005)	Member
91.	Lewis Hill	CprE	2001	Member
92.	Xiaorong Luo	Com S	2001	Member
93.	David Radack	CprE	2001	Member
94.	Vadhiraj Sankarnarayan	CprE	2001	Member
95.	Mayuresh Vartak	Com S	2001	Member
96.	Areej Al-Bataineh	CprE	2002	Member
97.	Patrick Bergan	CprE	2002	Member
98.	Sun Park	CprE	2002	Member
99.	Ruili Zhang	EE	2002	Member
100.	Janhavi Agashe	EE	2003	Member
101.	Bhanu Hariharan	CprE	2003	Member
102.	Shashank Krishnamurthy	EE	2003	Member
103.	Sriram Nadathur	CprE	2003	Member
104.	Bharath Vasudevan	CprE	2003	Member
105.	Randy Brown	CprE	2004	Member
106.	Richard Freeman	CprE	Pending	Member (2003)
107.	Scott Vanderkamp	CprE	2004	Member
108.	Yancong Zhu	CprE	Pending	Member (2003)
109.	Amjad Odet-Allah	CprE	2005	Member
110.	T. S. Ganesh	CprE	2006	Member
111.	Yanmei Wang	Com S	2006	Member
112.	Ziyu Zhang	CprE	2006	Member
113.	Mahantesh Hosamani	Com S	2007	Member
114.	Yuheng Long	Com S	2009	Member

## APPENDIX B: Summary of Teaching Evaluation

Term	Overall Instructor	Overall Course	Number & Percent Responding	Representative Student Comments
S' 09	4.88	4.56	16/20 (80%)	Prabhu is probably the <u>most</u> efficient and organized instructor I have studied under in the CS department. He effectively communicates exactly what he wants you to learn through homework and activities.
F '08 321	4.82	4.45	11/12 (92%)	I love how much I learned, yet how easy the learning was made with lectures, activities, and labs all together reinforcing ideas. Thanks for being such a great professor!
S '08 321	4.67	4.38	21/26 (81%)	Best class of the semester. Excellent teacher who cares about students learning.
F '07 321	3.75	3.83	12/19 (63%)	Very helpful in-class and outside class activities (HWs, quizzes, etc.)
S '07 321	1.22 (4.78)	1.33 (4.67)	9/11 (82%)	Very organized and clearly explained.
F '06 321	1.33 (4.67)	2.00 (4.00)	9/14 (64.3%)	Great instructor, helped me understand the material.  The in-class activities really helped me understand the material. Dr. Prabhu was a fantastic teacher.
S '06 321	1.13 (4.87)	1.40 (4.6)	17/27 (63%)	Excellent job. I wish more instructors would teach this way.  Going to class was something I looked forward to because it was so interesting yet understandable.
S '05 321  625	1.45 (4.55)  Unavailable	1.95 (4.05)	22/32 (68.8%)	Dr. Prabhu is probably the best instructor I've had in a 300 level Com Sci class. He explained material clearly and made the class enjoyable.

<b>F '04</b> 321	<b>1.36</b> <b>(4.64)</b>	1.59 (4.41)	22/32 (68.8%)	Dr. Prabhu was an outstanding instructor. In all my three years in Com Sci, he has been the best instructor.  Dr. Prabhu is one of THE BEST instructors Com Sci has.
<b>S '04</b> 321	<b>1.32</b> <b>(4.68)</b>	1.68 (4.32)	31/35 (88.6%)	Prabhu is the best instructor I have had till now. He is very good at explaining things clearly and keeps the course going at a rate everyone can understand.
<b>S '03</b> 321  625	<b>1.44</b> <b>(4.56)</b>  <b>1.60</b> <b>(4.4)</b>	1.72 (4.28)  1.60 (4.4)	43/61 (70.5%)  5/5 (100%)	Lecture and recitation are perfectly coordinated. Homework was relevant to lecture topics and helped prepare for exams. This class was an icon for how classes should be run.
<b>F '02</b> 321	<b>1.34</b> <b>(4.66)</b>	1.74 (4.26)	65/75 (86.7%)	Prof. Prabhu is a GREAT lecturer. I wish all my professors were as methodical in covering their material.
<b>S '02</b> 321	<b>1.31</b> <b>(4.69)</b>	1.76 (4.24)	52	One of the best teachers I've had. Teachers like him almost make me regret going to Business.
<b>F '01</b> 321	<b>1.64</b> <b>(4.36)</b>	2.13 (3.87)	48	You're one damn good Comp Sci professor. Too bad a lot of the professors don't show your effort and consideration in this major. Keep up the good work and thanks, I really enjoyed this class and learning from your experience.
<b>S '01</b> 625	<b>1.54</b> <b>(4.46)</b>	1.77 (4.23)	13	The professor is very nice and the class is well organized. I learned a lot from this class.
<b>Su '00</b> 228	<b>1.53</b> <b>(4.47)</b>	1.83 (4.17)	36	Has to be one of the best teachers in the Computer Science Department.

<b>S '99</b> 227	<b>1. 53</b> <b>(4.47)</b>	1.91 (4.09)	55	You did an excellent job of teaching the subject matter.
625	<b>1.71</b> <b>(4.29)</b>	2.00 (4.00)	17	
<b>F '98</b> 227	<b>4. 45</b>	4.16	94	Prabhu is a great teacher. He knew his stuff. This was the only class this semester I WANTED to come to.
228	<b>4. 05</b>	3.79	111	He is the one (and only) best instructor in the Com S department.
<b>Su '98</b> 330	<b>4. 52</b>	4.04	23	Assigning homeworks everyday helped me a lot in this course. The in-class activities were also useful.
<b>S '98</b> 227	<b>4. 45</b>	4.10	58	This is one of the best instructors I ever had. He really dedicates himself for his students and his course.  Very good instructor, very complete lectures.
207	<b>3. 96</b>	3.55	95	
<b>F '97</b> 227	<b>4. 45</b>	4.13	123	Enjoyable class. Prabhu is an excellent teacher.  I really liked this course. Prabhu did an excellent job of teaching difficult material in a very clear way.
524	<b>3. 84</b>	3.63	38	
<b>Su '97</b> 352	<b>4. 17</b>	3.86	36	Dr. Prabhu is the best Com Sci instructor I've had. He actually related the material to real life which was a great change.
<b>S '97</b> 227	<b>3. 49</b>	3.38	115	Really enjoyed the lectures. Dr. Prabhu has a very good, very effective teaching style. I hope to have him again in later courses.
625	<b>4. 67</b>	4.56	9	The course is very interesting. I really enjoyed it.

<b>F '96</b> 227	<b>3.61</b>	3.39	158	This class was well organized except for the last homework programming assignment which was too long.
				<b>SCALE:</b> A number of criteria were measured in the questionnaire. The data below is produced for the statement: <b>The instructor explains the material very clearly.</b> <b>1: strongly disagree; 2: disagree; 3: neutral; 4: agree; 5: strongly agree</b>
<b>Su '96</b> 311	<b>4.22</b>		53	Explained material very clearly. Did help students learn. One of the best instructors at ISU.
<b>S '96</b> 227	<b>3.74</b>		57	He was an excellent instructor. He was able to explain it well.
<b>F '95</b> 227 524	<b>3.91</b> <b>4.15</b>		54 34	Dr. Prabhu is an excellent instructor and has helped me learn a lot in this course. He does an excellent job of conveying the concepts.  This class was a great experience. It was good to have a real "teacher", someone who enjoys helping students understand what they need to learn.
<b>S '95</b> 321 625	<b>4.25</b> <b>4.20</b>		73 12	Dr. Prabhu is an excellent, fair, respectable instructor. Very clear in explaining material. The book by him and Wright is incredible.
<b>F '94</b> 321	<b>4.30</b>		63	Dr. Prabhu is a great instructor. This is one of the best coordinated classes I've taken at ISU.

<b>S '94</b>				The instructor was very knowledgeable and presents material in a manner easy to understand.
321	<b>4. 20</b>		88	
425	<b>4. 11</b>		18	The most interesting course I have taken as a Com S major at ISU. Excellent class!
<b>F '93</b>				On Faculty Improvement Leave
<b>S '93</b>				
321	<b>4. 33</b>		50	Good class. I wish all the instructors at Iowa State were as enthused about teaching as you are.
625	<b>4. 20</b>		8	
<b>F '92</b>				
321	<b>3. 88</b>		110	Great instructor.
<b>S '92</b>				
321	<b>3. 84</b>		78	I have had the complaint in the past of foreign teachers not being able to communicate well. This is NOT the case with Prabhu. He communicates very well.
<b>F '91</b>				
321	<b>3. 85</b>		89	I am going to be a senior next semester and after my 3.5 years at ISU, Dr. Prabhu is one of the best instructors I've had so far, the BEST in the Com Sci department. He is an extremely important asset to the faculty which has a lot to be desired.
<b>S '91</b>				
321	<b>4. 23</b>		88	Very good notes were given for the class.
625	<b>4. 28</b>		10	
<b>F '90</b>				
321	<b>3. 63</b>		100	I was remembering your Com Sci 321 lectures a lot. I am enrolled in 454 and am able to relate the material to the stuff you had taught and it

				made a lot of sense now. I think Com Sci 321 has been the most useful course I've had at ISU till now. (Note by Gagan Chopra).
<b>S '90</b> 321	<b>4. 26</b>		60	Prabhu has been one of the best instructors I have encountered in 4 years of college.
<b>F '89</b> 321 524	<b>3. 83</b> <b>3.78</b>		30 32	I found this class very interesting. I thought that Dr. Prabhu was very interesting and helpful.
<b>S '89</b> 321 571	<b>4. 25</b> <b>4. 32</b>		25 20	Excellent teacher. Very good instructing techniques to make me learn the material.
<b>F '88</b> 524	<b>3.72</b>		38	The material was challenging and useful.  By far, the best instructor I have had at ISU.
<b>Su '88</b> 342	<b>4. 90</b>		15	You are the best CS instructor I've had in 5 years.
<b>S '88</b> 342 571	<b>4. 16</b> <b>3. 92</b>		75 47	I enjoyed this class. Even though computer science is not my field of study, I found the material challenging and useful.
<b>F '87</b> 610			8	You're a wonderful teacher. The examples were clear and well motivated.

<b>Su '87</b> 221	<b>4. 53</b>		20	I wish ISU had more instructors like you.
<b>S '87</b> 221	<b>4. 37</b>		72	Very well taught course. I would have personally liked more labs and more lab time.
571	<b>4. 08</b>		32	Excellent instructor. Well organized.
591			29	
<b>F '86</b> 221	<b>3. 85</b>		98	You get your ideas and explanations across very well.
531	<b>4. 37</b>		45	I enjoyed this course very much. The instructor was excellent and able to explain things well.
<b>S '86</b> 342 (A)	<b>4. 66</b>		62	I think you are one of the best computer science instructors at ISU.
342 (B)	<b>4. 58</b>		74	You have been the best Com S instructor I've ever had. You seem to really want us to learn – that shows in the way you teach.
490		1		
591		33		
610		5		
<b>F '85</b> 531	<b>3. 99</b>		38	Your CLEAR, ORGANIZED examples for difficult concepts were greatly appreciated.
<b>S '85</b> 260	<b>4. 03</b>		97	The instructor was clear in the course objectives. The instructor met those objectives. Lectures were clear and understandable. It's too bad other computer science courses cannot be taught this way.
591X		26		
<b>F '84</b> 111	<b>See comment</b>		362	I had immigration problems caused by the university office – so had to leave the country in November and get a permanent visa and return. Hence my evaluations are not available.

<b>S '84</b> 332 (A)	<b>3.95</b>		63	Well organized course. More assertiveness in sparking interest by some of us more lazy undergraduates might have been helpful.
332 (B)	<b>3.95</b>		57	
<b>F '83</b> 260	<b>3.31</b>		95	Excellent teacher. Able to explain things well.

## APPENDIX B: Summary of Courses Developed and Taught

Course Number	Semester Developed	Semesters Taught	Comments
<b>Com S 260: Discrete Structures</b>	Fall 1983	Fall 1983, Spring 1985	Developed during my first semester at ISU. The class size was very large and we had no discussion or recitation sections.
<b>Com S 332: Introduction to Programming Languages</b>	Spring 1984	Spring 1984, Spring 1986 (modified and renumbered as 342), Spring 1988, Summer 1988	This course was outside my area but since there was no one else to teach it, I volunteered to develop and teach the course.
<b>Com S 111: Introduction to Programming</b>	Fall 1984	Fall 1984	I was assigned this course because I had to leave the country after 12 weeks and re-enter after obtaining a permanent visa.
<b>Com S 591: Faculty Research Interests</b>	Spring 1985	Spring 1985, Spring 1986, Spring 1987, Fall 1994, Fall 1995	This was a novel course designed to match student-faculty interests. It was a one-credit, Pass-NoPass course where graduate students learned about the research interests of the faculty in a weekly seminar setting. It is now a required course of all graduate students.
<b>Com S 531: Theoretical Foundations</b>	Fall 1985	Fall 1985, Fall 1986	I once again undertook development of a graduate course because there was no one else who wanted to do it.
<b>Com S 221: Introduction to Assembly Language and Computer Organization</b>	Fall 1986	Fall 1986, Spring 1987, Summer 1987	This was a new course for me and the preparation of laboratory experiments took up a lot of time.

<b>Com S 571: Introduction to Artificial Intelligence</b>	Spring 1987	Spring 1987, Spring 1988, Spring 1989	I undertook development of this course because the professor in charge lost his sons in a fire and then left the university.
<b>Com S 524: Introduction to Computer Architecture</b>	Fall 1988	Fall 1988, Fall 1989, Fall 1995, Fall 1997	Developed and taught this graduate course, which was required of all graduate students.
<b>Com S 321: Introduction to Assembly Language and Computer Architecture</b>	Spring 1989	Spring 1989, Spring 1990, Fall 1990, Spring 1991, Fall 1991, Spring 1992, Fall 1992, Spring 1993, Spring 1994, Fall 1994, Spring 1995	This course was redesigned from the old 221 and jointly developed with Professor Charles Wright of CprE in accordance with the model IEEE-ACM curriculum. We included a strong laboratory component and the notes and manuals we developed were published as a textbook in 1994.
<b>Com S 625: Issues in high-performance computing</b>	Spring 1991	Spring 1991, Spring 1993, Spring 1995, Spring 1997, Spring 1999, Spring 2001, Spring 2003, Spring 2005	Developed and taught the first advanced graduate course in my own research area. This was jointly taught with John Gustafson the first couple of times.
<b>Com S 425: Introduction to high- performance computing</b>	Spring 1994	Spring 1994	There was a lot of student demand for a senior-level elective in high-performance computing and so I developed and taught a version of 625 at the senior undergraduate level.

<b>Com S 227: Introduction to Programming (using Scheme)</b>	Fall 1995	Fall 1995, Spring 1996	Developed and taught the frontier course for majors in the programming language Scheme. I had to learn Scheme and coordinate the course with another instructor.
<b>Com S 311: Design and Analysis of Algorithms</b>	Summer 1996	Summer 1996	<p>The chair asked me to develop and teach this course because for many years this course was being taught without assigning programming projects for students.</p> <p>When students heard that I was teaching the course, we had a record enrollment of 70 students during the summer. I made students write at least one program every week and also assigned two major programming projects. Feedback from students was very positive.</p>
<b>Com S 227: Introduction to Programming (using C++)</b>	Fall 1996	Fall 1996, Spring 1997, Fall 1997, Spring 1998, Fall 1998, Spring 1999,	<p>This course was jointly developed with Professor Albert Baker. Since 1993, the department had been offering a two-semester introductory sequence with Scheme in the first course (227) and C++ in the second (228). Student feedback was quite negative and after studying the problem, we decided to offer a two-semester sequence, both in C++. The large section sizes and the huge administrative overhead took up a lot of time and effort and severely constrained my research program.</p>

<b>Com S 352: Operating Systems</b>	Summer 1997	Summer 1997	After having successfully taught 311 the previous summer, the chair asked me to do a similar job in 352. I developed and taught a hands-on course with many laboratory exercises. One student wrote, "Dr. Prabhu is the best Com Sci instructor I've had. He actually related the material to real life which was a great change."
<b>Com S 207: Introduction to Programming (C++ for Non-Majors)</b>	Spring 1998	Spring 1998	I developed and team taught this course with another instructor. Since the course was for non-majors, the programming assignments and the level of the course were considerably different from 227, the corresponding course for majors. The large class size and the coordination posed a huge administrative challenge.
<b>Com S 330: Discrete Mathematics</b>	Summer 1998	Summer 1998	Having chaired the UG committee since 1994, it had come to my attention that students were not getting enough programming experiences in our curriculum. So with the success I had in 311 (Su 1996) and 352 (Su 1997) I developed this course and injected programming projects. Students found that both challenging and useful.

<b>Com S 228: Introduction to Data Structures</b>	Fall 1998	Fall 1998, Fall 1999 (co-ordinator), Spring 2000 ( course co-ordinator)	Developed and taught the second frontier course in C++. In this semester I taught 227 and 228, both of which had large class sizes and tremendous administrative overhead.
<b>Com S 321: Introduction to Assembly Language and Computer Architecture</b>	Fall 2001	Fall 2001, Spring 2002, Fall 2002, Spring 2003, Spring 2004, Fall 2004, Spring 2005, Spring 2006, Fall 2006, Spring 2007, Fall 2007, Spring 2008, Fall 2008, Spring 2009, Fall 2009	After a hiatus, I had to once again develop this course which had been changed since I last developed and taught it.