

**James H. Garrett, Jr.**

**Curriculum Vitae**

April 7, 2009

**Department of Civil and Environmental Engineering**  
Carnegie Institute of Technology  
Carnegie Mellon University  
Pittsburgh, Pennsylvania 15213-3890  
(412) 268-5674

## 1. Biographical Data

### 1.A. Place and Date of Birth

Pittsburgh, PA

January 12, 1961



### 1.B. Education:

Degree	Discipline	University	Date
B.S.	Civil Engineering	Carnegie Mellon University	1982
M.S.	Civil Engineering	Carnegie Mellon University	1983
Ph.D.	Civil Engineering	Carnegie Mellon University	1986

### 1.C. Professional Engineering Licensure

State	Number	Status
Texas	102732	Active

### 1.D. Current and Former Positions

*June 2006 - present*

Head, Department of Civil and Environmental Engineering, Carnegie Mellon University

*April 2004 – July 2004*

Acting Dean, College of Engineering, Carnegie Mellon University

*July 2000 – June 2006*

Associate Dean for Academic Affairs, College of Engineering, Carnegie Mellon University

*July 1996 - present*

Professor, Department of Civil and Environmental Engineering, Carnegie Mellon University

*July 1993 - July 1996*

Associate Professor, Department of Civil and Environmental Engineering,  
Carnegie Mellon University

*July 1990 - July 1993*

Assistant Professor, Department of Civil Engineering, Carnegie Mellon University

*August 1987 - July 1990*

Assistant Professor, Department of Civil Engineering, University of Illinois at Urbana-Champaign

*October 1986 - August 1987*

Project Engineer, Schlumberger Well Services, Houston Downhole Sensors

## 2. Teaching and Education

### 2.A. Courses Taught at CMU

Course Number	Course Title	Units	Class	Num. of Students	Offered	FCE Ratings: Course	FCE Ratings: Instr
12-241	Introduction to Computer Applications in Civil Engineering	9	So	43	F 90	3.72	3.64
12-749	Advanced Topics in CAE - Neural Networks	9	Gr	8	S 91	4.86	4.86
12-241	Introduction to Computer Applications in Civil Engrg	9	So	41	F 91	3.47	3.32
12-741	Advanced Programming Concepts in CAE	12	Gr	9	F 91	4.44a	4.33a
12-743/ 48-743	Experts Systems in CAE	6	Gr	29	S 92	4.39b	4.46b
12-741	Advanced Programming Concepts in CAE	12	Gr	15	F 92	4.4	5.00
12-749	Advanced Topics in CAE - Neural Networks	9	Gr	17	S 93	4.75	4.75
12-741	Advanced Programming Concepts in CAE	12	Gr	7	F 93	4.14	4.46
12-748/ 48-748	Design of CAE Systems	12	Gr.	12	F 93	4.75	4.50
12-741	Advanced Programming Concepts in CAE	12	Gr	7	F 94	4.71c	5.00c
12-748/ 48-748	Design of CAE Systems	12	Gr.	5	F 94	4.75d	4.75d
12-744/ 48-744	Fund. of Graphics for CAE	6	Gr.	6	S 95	4.83	4.83

*notes:*

- a. Team taught with Prof. Daniel Rehak (75% JHG, 25% DRR)
- b. Composite FCEs across cross-listed sections (12-743 and 48-743)
- c. Team taught with Prof. Haris Koutsopoulos (75% HNK, 25% JHG)
- d. Team taught with Prof. Steven Fenves (75% JHG, 25% SJF)

Course Number	Course Title	Units	Class	Num. of Students	Offered	FCE Ratings: Course	FCE Ratings: Instr
12-748/ 48-748	Design of CAE Systems	12	Gr.	8	F 95	5.00d	4.875d
12-411	Engineering Economics	9	Jr.	32	S 96	4.78	4.56
12-744/ 48-744	Fund. of Graphics for CAE	12	Gr.	4	S 96	4.75	4.5
12-100	Intro to Civil and Env Engineering	12	Fr.	71	F 96	3.98	4.0
12-743	KBES in CAE	6	Gr.	17	S 97	4.375	4.375
12-100	Intro to Civil and Env Engineering	12	Fr.	36	F 97	4.42	4.61
12-747	Software Project in CAE	12	Gr.	3	S 98	4.31	4.23e
12-743	KBES in CAE	3	Gr.	18	S 98	5.0	5.0
12-100	Intro to Civil and Env Engineering	12	Fr.	42	F 98	4.37	4.43
12-747	Software Project in CAE	12	Gr.	30	S 99	3.67	4.00e
12-743	KBES in CAE	3	Gr.	12	S 99	4.55	4.91
12-100	Intro to Civil and Env Engineering	12	Fr.	36	F 99	4.40	4.47
12-743	KBES in CAE	3	Gr.	9	S 00	4.71	5.00
39-647	Eng. Prod. Design Projs. Engineering	12	Sr/Gr	12	S 00	4.50f	4.25f
39-605	Eng. Prod. Design Projs. Engineering	12	Sr/Gr	12	F 00	4.00	4.33
39-606	Eng. Prod. Design Projs. Engineering	12	Sr/Gr	25	S 01	4.13	4.19
39-605	Eng. Prod. Design Projs. Engineering	12	Sr/Gr	6	F 01	3.83	4.00

*notes:*

d. Team taught with Prof. Steven Fenves (75% JHG, 25% SJF)

e. Coordinated as part of the ECE Rapid Prototyping of Computer Systems (18-745)

f. Not a formally collected FCE. Collected by main instructor (Westerberg) for each individual project leader in the course.

<b>Course Number</b>	<b>Course Title</b>	<b>Units</b>	<b>Class</b>	<b>Num. of Students</b>	<b>Offered</b>	<b>FCE Ratings: Course</b>	<b>FCE Ratings: Instr</b>
39-606	Eng. Prod. Design Projs. Engineering	12	Sr/Gr	8	S02	3.86	4.67
39-606	Eng. Prod. Design Projs. Engineering	12	Sr/Gr	7	S03	4.83	4.33
12-411	Engineering Economics	6	Sr/Gr	30	F03	4.35	4.55
39-605	Eng. Prod. Design Projs. Engineering	12	Sr/Gr	3	S04	3.5	3.0
12-770	Special Topics: Fund Conc. in Computer-Aided Engineering	12	Sr/Gr	7	S05	4.57	4.86
39-101	CIT First Year Seminar	1	Fr	400	F05	2.3	2.9
12-742	Computational Decision Support (g)	6	Gr	13	S06	4.18	4.73
12-411	Engineering Economics	6	Sr/Gr	36	F06	3.8	4.2
12-742	Computational Decision Support	6	Gr	16	S07	4.0	4.4
12-411	Engineering Economics	6	Sr/Gr	47	F07	4.2	4.4
12-744	AIS Project Preparation	9	Gr	9	F07	4.5	4.8
12-742	Computational Decision Support	6	Gr	19	S08	4.0	4.41
12-745	AIS Project (h)	9	Gr	6	S08	4.25	4.25
12-411	Engineering Economics	6	Sr/Gr	43	F08	4.38	4.65
12-671	Intro to Concepts of Comp in CEE (h)	9	Sr/Gr	5	F08	4.40	4.70
12-742	Computational Decision Support	6	Gr	20	S09	4.3	4.5

*notes:*

g. First time this course was taught in mini-course format.

h. Co-taught with Lucio Soibelman

## **2.B. Student Projects**

### **(a) Undergraduate Projects**

1. Michael Miller, "A Hypertext Representation of Engineering Design Standards," Senior Project, Fall 1991.
2. Annie Pearce, "Video-Based Vehicle Detection using Neural Networks," CIT Honors Research Project, Fall 1991 - Spring 1992.
3. Douglas Vunic, "Neural Network-based Interpretation of Concrete Heat Signatures," Senior Project, Fall 1992.
4. Richard Quinn, "Applying the AES Structural Package to the Smithfield St. Bridge," Senior Project, Spring 1993.
5. Wendy Burton, "Developing a Detailed Classification System for the Pennsylvania Landfill Regulations," Senior Project, Fall 1995.
6. Heather Blair, Liam Lim, Laura Miyakawa, CIT Honors Research Project AY 2000-01, "MEMS-based Vehicle Detection at Intersections," co-advised with Chris Hendrickson.
7. Douglas Holman, ECE, CIT Honors Research Project AY 2003-2004, "Construction Dataport."

### **(b) Master's Students**

1. Nenad Ivezic, "NETSYN - A Neural Network Approach for Engineering Synthesis Knowledge Acquisition and Use," Oct. 1992.
2. Gary Hooyman, "An Object-Oriented User Interface for Standards Modeling," Sept. 1992.
3. Chih Chieh Tsai, "Interpretation of Ground Penetrating Radar Signals using Neural Networks," Jan. 1993.
4. Thomas Chmielenski, "A Standards Processing Environment Using a Context-Oriented Approach to Standards Modeling," September 1993.
5. Han Kiliccote, "A Context-Oriented Model of Engineering Design Standards," January 1994
6. Mark Krofchik, "Mosaic-based Standards Broker for Environmental Regulations," June 1995.
7. Dana Stasiak, "An Environmental Regulations Broker: Classification and Co-Word Analysis," September 1996.
8. Richard Quinn, "A Java-based System for Supporting Student Truss Analysis," August 1997.
9. Vei-Chung Liang, "A Java-based Environmental Regulation Broker," May 1998.
10. Douglas Sackin, "MEMS Applications in Civil Infrastructure," December 1999.
11. Richard Hallon, "The Potential Use of Moisture Sensors on PeopleMover Guideways: Experimentation and Cost/Benefit Analysis," December 2000.
12. DeWitt Latimer, "Estimating the Cost of Software Components in Civil System Development Using Function Point Analysis," May 2002.

13. Ping Chen, "WEB-VACUUM: A Web-based Environment for Assessing Civil Infrastructure Data Quality", Dec 2003.
14. Vincent Collins III, "Evaluation of Several technologies for the Maturity Method for Concrete Strength Determinatuon", September 2004.
15. Jaime Wright, Assisted on the Augmented Reality Project for Bridge Inspection, July 2006
14. Mr. Abhinav Agrawal (co-advised with Lucio Soibelman and Hoon Sohn)
15. Mr. Saurabh Taneja (co-advised with Burcu Akinci), Sensor Fusion for HVAC System Modeling and Reconfiguration

**(c) Ph.D. Students**

1. Dr. Wayne Seiler (Advised jointly with Prof. M. I. Darter at the University of Illinois),  
"A Knowledge-Based Expert System for Airport Pavement Diagnosis," November 1990.  
  
Present Position: Engineer, ERES Consulting, Champaign, IL
2. Dr. Xiping Wu (Co-advised with Prof. J. Ghaboussi at the University of Illinois),  
"A Neural Network-based Approach to Material Modeling," July 1991.  
  
Present Position: Asst. Prof., Dept. of Civil Engrg., University of Singapore.
3. Dr. Jerry Yau (Co-advised with Prof. J. Melin at the University of Illinois),  
"Object-Oriented Model for Integrating Design, Scheduling and Cost Estimation," March 1992.  
  
Present Position: Asst. Prof., Dept. of Civil Engrg., National Central University, Taiwan.
4. Dr. S. Ranjithan (Co-advised with Prof. J. W. Eheart at the University of Illinois),  
"Neural Networks for Screening Distributed Parameter Fields with Application to Groundwater Remediation," June 1992.  
  
Present Position: Assoc. Professor, Dept.of Civil Engineering, North Carolina State University
5. Dr. Rajaram Ganeshan (Co-advised with Prof. Susan Finger),  
"Representing and Reasoning with Design Intent," August 1992.  
  
Present Position: Researcher, U. S. Army Construction Engineering Research Laboratory
6. Dr. Maher Hakim, "Modelling Evolving Information about Engineering Design Products," Sept. 1993.  
  
Present Position: Founder and CEO of Apexion, San Francisco, CA.
7. Dr. Nenad Ivezic, "Machine Learning for Supporting Collaborative Engineering Agents,"  
December 1995.  
  
Present Position: Oak Ridge National Laboratories
8. Dr. Han Kiliccote, "SPF:A Distributed Standards Processing Framework," January 1997.  
  
Present Position: Senior Software Engineer, Atoga, San Jose, CA

9. Dr. Octavio Juarez-Espinoza, "Development of User-Centered Environmental Software Systems," (Co-advised with Prof. Chris Hendrickson), May 1999.  
  
Present Position: Research Staff, Robotics Institute, Carnegie Mellon University
10. Dr. Jirapon Sunkpho, "A Framework for Rapid Development of Speech-Controlled Interfaces for Mobile Data Collection Systems," September 2001.  
  
Lecturer, Walailak University, Thailand
11. Dr. Rebecca Buchheit, "VACUUM: An Automated Procedure for Assessing and Cleansing Civil Infrastructure Monitoring Data," May 2002.  
  
Present position: Post-doctoral researcher at Carnegie Mellon University
12. Dr. Christian Buergy, "Interaction Constraints Model for Designing Mobile IT Devices for Industrial Environments," May 2002.  
  
Present position: President, WearableConsult
13. Dr. Jan Reinhardt, "Navigational Models for Accessing Construction Information On-Site", (Co-advised with Prof. Burcu Akinci), Dec 2003.  
  
Present Position: Research Engineer, Turner Construction
15. Dr. Hongjun Wang, Domain-Oriented Semi-Automated Model Matching for Supporting Building Commissioning-Related Data Exchange (Co-advised with Burcu Akinci), May 2006.  
  
Present Position: Project Engineer, Ansys, Inc.
16. Dr. Ping Chen, Assessment of Critical Infrastructure Interdependencies (Dissertation Advisor was Scott Matthews; Garrett was an Academic Advisor), September 2006.  
  
Present Position: Data Analyst, Morgan Stanley
17. Dr. Vipul Singhvi, Machine Learning Based Building Control Strategy (Co-advised with Scott Matthews), August 2006.  
  
Present Position:
18. Dr. Chris Gordon, A Formalism and a Framework for Planning of Sensor-Based Inspections on Construction Sites, (Co-advised with Burcu Akinci), December 2006.  
  
Present Position: Assistant Professor, Southern Illinois University, Edwardsville
19. Dr. Wei Guo, (co-advised with Lucio Soibelman), August 2008,  
  
Present Position: Assistant Professor at Oregon State University, Department of Civil and Environmental Engineering
20. Mr. Michael Bigrigg (Co-advised with Scott Matthews)
21. Mr. Daniel Oliviera, (co-advised with Lucio Soibelman)
22. Mr. Chung-Yan Shih, (co-advised with Lucio Soibelman and Scott Matthews)

23. Mr. Elfatih Ahmed, Using FRP for Suspension Bridge Decks
24. Ms. Asli Akcamete, (Co-advised with Burcu Akinci)
25. Mr. Saurabh Taneja, (Co-advised with Burcu Akinci)
26. Ms. Yujie Ying (co-advised with Lucio Soibelman)
27. Mr. Mohsen Shandahasti (co-advised with Burcu Akinci and Lucio Soibelman)
28. Mr. Salih Demir (co-advised with Burcu Akinci)
29. Mr. Fernando Cerda (co-advised with Jacobo Bielak)

## 2.C. Educational Contributions

In 1990, I integrated symbolic math software and concepts into the Sophomore-level course, 12-241: "An Introduction to Computer Applications in Civil Engineering."

In 1991, I developed a new graduate course, "Neural Network Applications in Engineering" (it is now offered bi-annually). In this course, students are presented with the fundamental characteristics of the connectionist paradigm, provided with case studies of applied neural networks, and then asked to apply that paradigm to an engineering problem of their choosing.

In 1992, I served on the University Task Force for Undergraduate Computing.

In 1996, I led a committee that produced our course-only option M.S. degree program.

In 1998, I worked with Professor Sue McNeil to design and add content into an online version of the Engineering Economics course (12-411).

In 1999, I started a course on the Applications of Microelectromechanical Systems (MEMS) in Civil Infrastructure.

From 2000-2004, I participated in the CIT Interdisciplinary course, entitled Engineering Design Projects, and succeeded in bringing innovative projects and project sponsors to this course and guiding student teams through interdisciplinary, team-based engineering design experiences.

In 2003, I restructured the Engineering Economics course into a 6 unit mini-course.

In 2005, I and my colleagues developed a new graduate program known as the Advanced Infrastructure Systems program. I also developed a new course on Intelligent Decision Support Systems as part of the new Advanced Infrastructure Systems Graduate Curriculum.

In Fall 2008, Lucio Soibelman and I launched a new course entitled "Introductions to Concepts in Computing for Civil and Environmental Engineers." The course is intended to expose students to important computing concepts, such as how a computer works, data structures, algorithms, search and optimization algorithms, including genetic algorithms, machine learning, and current research activity related to computing in CEE.

Throughout my career, I have actively participated in national and international short courses on the topics of applying knowledge-based systems and neural networks to engineering problems. Please see list of these short courses at the end of this vitae. I also have authored several monograph chapters and review articles introducing CAE concepts from a civil engineering perspective: two ASCE monograph chapters introducing neural networks; one monograph chapter reviewing AI and Expert Systems texts; and one article in *Structural Engineering International*) that presents an overview of a variety of information technologies important to civil and structural engineers.

### 3. Publications

#### 3.A. Books

None

#### 3.B. Archival Papers Critically Reviewed Before Publication

1. Gordon, C., B. Akinci and J. H. Garrett, Jr., "Characterization and Search of Construction Inspection Plan Spaces Developed Using a Component-Based Planning Approach" *In press* for the *Journal of Computing in Civil Engineering*, July 2009.
2. Guo, W., L. Soibelman, and J. H. Garrett, Jr. "Automated Defect Detection for Sewer Pipeline Inspection and Condition Assessment," *In Press* in *Automation in Construction*, 2009, DOI information: 10.1016/j.autcon.2008.12.003.
3. Wang, H., B. Akinci and J. H. Garrett, Jr., K. Reed, E. Nyberg. "Semi-Automated Model Matching using Version Difference", in *Advanced Engineering Informatics*, Vol. 23, No. 11, pp. 1-11, January 2009.
4. Guo, W., L. Soibelman and J. H. Garrett, Jr., "Imagery Enhancement and Interpretation for Remote Visual Inspection of Aging Civil Infrastructure", *Tsinghua Science and Technology*, Elsevier, Vol. 13, No. S1, pp. 375-380, October 2008.
5. Wang, H., B. Akinci J. H. Garrett, Jr., and K. Reed "A Formalism for Applying Constraints in Domain-Oriented Schema Matching" *Journal of Computing in Civil Engineering*, Vol. 22, No. 3, pp. 170-180, May/June 2008.
6. Gordon, C., B. Akinci and J. H. Garrett, Jr., "A formalism for construction inspection planning." *Automation in Construction*, Vol. 17, Issue 6, pg. 705-718, August 2008.
7. Wang, H., B. Akinci and J. H. Garrett, Jr., "A Formalism for Detecting Version Differences in Data Models", *Journal of Computing in Civil Engineering*, Vol. 21, No. 5, September/October 2007.
8. Gordon, C. J., B. Akinci and J. H. Garrett, Jr., "Formalism for construction inspection planning: requirements and process concept" *Journal of Computing in Civil Engineering*, Vol. 21, No. 1, pp. 29-38, January 2007.
9. Reinhardt, J, B. Akinci, and J. H. Garrett, Jr., "A Navigational Model for Providing Customized Representations for Effective and Efficient Interaction with Mobile Computing Solutions on Construction Sites," *ASCE Journal of Computing in Civil Engineering*, Volume 19, Number 2, pp. 109-118, 2005.
10. Singhvi, V., A. Krause, C. Guestrin, H. S. Matthews, J. H. Garrett, Jr., *Intelligent Lighting Control using Sensor Networks, SenSys'05*, November 2-4, 2005, San Diego, California, USA.
11. Chen, P., R. B. Buchheit, J. H. Garrett, Jr., S. McNeil "Web Vacuum: A Web-Based Environment for Automated Assessment of Civil Infrastructure Data," *ASCE Journal of Computing ion Civil Engineering*, Volume 19, Number 2, PP. 137-147, 2005.
12. Buchheit, R. B., J. H. Garrett, Jr., S. McNeil, P. Chen, "An Automated Procedure to Assess Civil Infrastructure Data Quality," *ASCE Journal of Infrastructure Systems*, Vol. 11, No. 3, pp. 180-189, September 2005.

13. Sunkpho, J., J. H. Garrett, Jr., S. McNeil, "XML-Based Inspection Modeling for Developing Field Inspection Support Systems," *ASCE Journal of Infrastructure Systems*, Vol. 11, No. 3, pp. 190-200, September 2005.
14. Reinhardt, J., B. Akinci, J. H. Garrett, Jr., "Navigational models for computer supported project management tasks on construction sites," Vol. 18, No. 4, pp. 281-290, *Journal of Computing in Civil Engineering*, October 2004.
15. Yun, H., M. E. Patton, J. H. Garrett, Jr., G. K. Fedder, K. M. Frederick, J-J Hsu, I. J. Lowe, I. J. Oppenheim, P. Sides, "Detection of Free Chloride in Concrete by NMR," in the *Journal of Cement and Concrete Research*, Vol. 34, pp. 379-390, 2004.
16. Sunkpho, J., J. H. Garrett, Jr., "JIF: A Framework for Developing a Field Inspection Support System for Civil Systems Inspection." *ASCE Journal of Computing in Civil Engineering* , Vol. 17, No. 4, pp. 209-218, October 2003.
17. Subrahmanian, E., A. Westerberg, S. Talukdar, J. Garrett, A. Jacobson, C. Paredis, C. Amon, P. Herder, A. Turk, "Integrating Social Aspects and Group Work Aspects in Engineering Design Education," *Int. J. Engng. Ed.*, Vol 19, No. 1, pp. 75-80, 2003.
18. Kiliccote, H. and J. H. Garrett, Jr., "Agents for Standards Processing," in *International Journal of IT in Architecture, Engineering and Construction (IT-AEC): Special issue on Agents and Multi-Agent Systems in Construction*, Millpress Science Publishers, pp. 9-26, January 2003
19. Kiliccote, H. and J. H. Garrett, Jr., "The Standards Usage Language (SUL): An Abstraction Boundary between Design Systems and Standards Processors" *Journal of Computing in Civil Engineering* , Vol 15, No. 2, pp. 118-128, 2001.
20. R. B. Buchheit, J. H. Garrett, Jr., S. R. Lee, and R. Brahme, "A Knowledge Discovery Framework for Civil Infrastructure," *Engineering with Computers Journal*, Vol. 16, pp. 264-274, 2000.
21. Liang, V.-C. and J. H. Garrett, Jr., "Java-based Environmental Regulations Broker," *Journal of Computing in Civil Engineering*, Vol. 14, No. 2, pp. 100-108, April 2000.
22. Kiliccote, H. and J. H. Garrett, Jr., "Standards Modeling Language," *Journal of Computing in Civil Engineering*, Vol. 12, No. 2, pp. 129-135, July, 1998.
23. Amekudzi, A., P. Fischbeck, J. Garrett, Jr., H. Koutsopoulos, S. McNeil, and M. Small, "Computer Tools to Facilitate Brownfield Development," *Journal of Public Works Management and Policy*, Vol. 2, No. 3, pp. 231-241, January, 1998.
24. Garrett, Jr., J. H., "The Computer-Aided Engineering: Prospects and Risks," *Journal of AI in Engineering Design, Analysis and Manufacturing (AI EDAM)*, Vol 12, No. 1, pp. 61-63, 1998.
25. Ivezic, N. D. and J. H. Garrett, Jr., "Machine Learning for Simulation-based Support of Early Collaborative Design," *Journal of AI in Engineering Design, Analysis and Manufacturing (AI EDAM)*, Vol 12, No. 2, pp. 123-139, 1998.
26. Hakim, M. M. and J. H. Garrett, Jr., "An Object-Centered Approach for Modeling Engineering Design Products: Combining Description Logic and Object-Oriented Models," *Journal of AI in Engineering Design and Manufacturing (AI EDAM)*, Vol. 11, pp. 187-198, 1997.

27. Yamamoto, K., J. H. Garrett, Jr., K. Saito. "Representing Buckling Information using Neural Networks," Japan Society of Civil Engineers *Journal of Structural Engineering*, Vol. 43A, pp. 55-64, March 1997 (in Japanese).
28. Mantri, S., D. Bullock and J. H. Garrett, Jr. "Vehicle Detection Using a Hardware-Implemented Neural Net," *IEEE Expert*, Vol. 12, No. 1, pp. 15-21, January-February 1997.
29. Bhavnani, S. K., U. Flemming, D. E. Forsythe, J. H. Garrett, Jr., D. S. Shaw, A. Tsai, "CAD usage in an architectural office: from observations to active assistance," *Automation in Construction*, No. 5, pp. 243-255, Elsevier, 1996.
30. Kiliccote, H., B. Choi and J. H. Garrett, Jr. "Providing formal support for standards usage in SEED," *ASCE Journal of Architectural Engineering*, Special Edition on the Carnegie Mellon University SEED Project, Vol. 1, No. 4, pp. 187-194, December 1995.
31. Fenves, S. J., J. H. Garrett, Jr., H. Kiliccote, K. Law and K. Reed, "Computer Representations of Design Standards and Building Codes: A U.S. Perspective," *International Journal of Construction Information Technology*, Special Edition on the National Status of Computer Representations of Design Standards and Building Codes, D. Vanier, ed., Vol. 3, No. 1, pp. 13-34, 1995.
32. Yang, D., J. H. Garrett, Jr., D. S. Shaw, L. A. Rendell, "AUGURS: An Intelligent Symbol Usage Assistant Embedded in a CAD System," *IEEE Expert*, Vol. 9, No. 3, pp. 32-41, June 1994.
33. Yang, D., J. L. Webster, L. A. Rendell, D. S. Shaw and J. H. Garrett, Jr., "Symbol recognition in a CAD environment using a neural network." *International Journal of Artificial Intelligence Tools (Architectures, Languages, Algorithms)*, Vol. 3, No. 2, pp. 157-185, June 1994.
34. Ivezic, N. and J. H. Garrett, Jr., "Neural Network-based Machine Learning Support for Synthesis," *Journal of Artificial Intelligence in Engineering Design, Analysis and Manufacturing (AI EDAM)*, Vol. 8, pp 143-161, 1994.
35. Ganeshan, R., J. H. Garrett, Jr., and S. Finger, "A Framework for Representing Design Intent," *Journal of Design Studies*, Butterworth Scientific Limited, Vol. 15, No. 1, pp 59-84, January 1994.
36. Bullock, D. M., J. H. Garrett, Jr., and C. T. Hendrickson, "A neural network for image-based vehicle detection," *Journal of Transportation Research, Part C*, Vol. 1C, No. 3, pp. 235-247, September 1993.
37. Hakim, M. and J. H. Garrett, Jr., "Using Description Logic for Representing Engineering Design Standards," *Journal of Engineering with Computers*, Vol. 9, pp. 108-124, 1993.
38. Garrett, Jr., J. H., M. P. Case, S. Yeramreddy, A. E. Herman, J. P. Hall, S. Ranjithan, R. Sun, and J. Westervelt, "Engineering Applications of Neural Networks," *Journal of Intelligent Manufacturing - Special Issue on Neural Networks*, Soundar Kumara, ed., Vol. 4, No. 1, pp. 1-21, February 1993.
39. Ranjithan, S., J. W. Eheart, and J. H. Garrett, Jr, "A Neural Network-Based Screening Tool for Groundwater Reclamation Under Uncertainty," *Journal of Water Resources Research*, Vol. 29, No. 3, pp. 563-574, March 1993.
40. Songer, A., Ibbs, C. W., Garrett, Jr. J. H., Napier, T., Stumpf, A., "A Knowledge-Based Expert System for Design-Build Project Planning," *Journal of Computing in Civil Engineering*, Vol. 6, No. 4, pp. 456-471, October 1992.

41. Garrett, Jr., J. H. and M. M. Hakim, "An Object-Oriented Model of Engineering Design Standards," *Journal of Computing in Civil Engineering*, Vol. 6, No. 3, pp. 323-347, July 1992.
42. Wu, X., J. Ghaboussi, and J. H. Garrett, Jr, "Use of Neural Networks in the Detection of Structural Damage," *Computers and Structures*, Vol. 42, No. 4, pp. 649-659, 1992.
43. Benekohal, R. F., J. H. Garrett, Jr., and J. Linkenheld, "PHAST - A Knowledge-Based System for Phasing and Signal Timing of Intersections," *Journal of Transportation Engineering*, Vol. 118, No. 2, pp. 241-257, March/April 1992.
44. Ghaboussi, J., J. H. Garrett, Jr., and X. Wu, "Knowledge-Based Modeling of Material Behavior with Neural Networks," *Journal of Engineering Mechanics*, Vol. 117, No. 1, pp. 132-153, January 1991.
45. Garrett, Jr., J. H., "Application of Knowledge-Based Expert System Techniques to Standards Representation and Usage," *Building and Environment Journal*, Vol. 25, No. 3, pp. 241-251, 1990.
46. Garrett, Jr., J. H. and S. J. Fenves, "Knowledge-Based Standard-Independent Member Design," *Journal of Structural Engineering*, Vol. 115, No. 6, pp. 1396-1411, June 1989.
47. Garrett, Jr., J. H. and A. Jain, "Encore: An Object-Oriented Knowledge-Based System for Transformer Design," *Journal of Artificial Intelligence in Engineering, Design, and Manufacturing (AI EDAM)*, Vol. 2, No. 2, pp. 123-134, 1988.
48. Garrett, Jr., J. H. and S. J. Fenves, "A Knowledge-Based Standard Processor for Structural Component Design," *Engineering with Computers*, Vol. 2, No. 2, pp. 219-238, 1987.
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53. Hakim, M. M. and J. H. Garrett, Jr., "Modeling Engineering Design Information: An Object-Centered Approach," Proceedings of the First ASCE Congress on Computing in Civil Engineering, pp. 563-571, Washington, D.C., June 1994.
54. Ivezic, N. and J. H. Garrett, Jr., "A Machine Learning-based Decision Support System for Collaborative Design," Proceedings of the First ASCE Congress on Computing in Civil Engineering, pp. 901-908, Washington, D.C., June 1994.
55. Diaz-Calderon, A., S. J. Fenves, J. H. Garrett, Jr. and C. T. Hendrickson, "Computer-based Advisors for Environmentally Conscious, 'Green' Product Design," Proceedings of the First ASCE Congress on Computing in Civil Engineering, pp. 1497-1504, Washington, D.C., June 1994.
56. Garrett, Jr., J. H., "Automated Processing of Design Standards: Are We There Yet?" Proceedings of the International Workshop on the Future Directions of CAE, Carnegie Mellon University, pp. 63-68, Pittsburgh, PA, June 1994.
57. Bhavnani, S., J. H. Garrett, Jr., U. Flemming, and D. Shaw, "Towards Automated Assistance: What To Do When the User Does Not Know When and How to Ask," Proceedings of the International Workshop on the Future Directions of CAE, Carnegie Mellon University, pp. 183-187, Pittsburgh, PA, June 1994.
58. Fenves, S. J., J. H. Garrett, Jr., and M. Maher Hakim, "Representing and Processing Design Standards: A Bifurcation between Research and Practice," Proceedings of the ASCE Structures Congress XII, pp. 122-127, Atlanta, GA, April 1994. (Invited contribution)
59. Garrett, Jr., J. H. and M. M. Hakim, "Class-centered vs. Object-centered Approaches for Modeling Engineering Design Information," Proceedings of the IKM?Internationales Kolloquium über Anwendungen der Informatik und der Mathematik in Architektur und Bauwesen (Colloquium on Mathematics and Information Sciences in Building Engineering), pp. 267-272, Weimar, Germany, March 1994.
60. Garrett, Jr., J. H. and M. M. Hakim, "Creating Computable Models of Engineering Design Standards Using Description Logic," Proceedings of the 1994 Design and Manufacturing Grantees Conference, National Science Foundation, pp. 33-34, Boston, MA, January, 1994.
61. Ivezic, N., and J. H. Garrett, Jr., "NETSYN: Neural Network-based Support for Synthesis," Proceedings of the ASCE International Conference on Computing in Civil and Building Engineering, pp. 1440-1447, Anaheim, CA, June 1993.

62. Simiu, E., J. H. Garrett, Jr., K. A. Reed, "Development of Computer-Based Models of Standards and Attendant Knowledge-based and Procedural Systems," Proceedings of the ASCE Structures Congress XI, pp. 841-846, San Antonio, TX, April 1993.
63. Hakim, M. M., J. H. Garrett, Jr., and G. Hooyman, "An Environment for Automated Standards Usage: A Progress Report for 1992," Proceedings of 1993 NSF Grantees Conference for Design and Manufacturing Systems, pp. 541-552, Charlotte, NC, January 1993.
64. Yang, D., J. H. Garrett, Jr., D. S. Shaw, "A Comparative Study of Neural Networks that can Perform Transformation-Invariant Pattern Recognition," Proceedings of the International Joint Conference on Neural Networks, pp. 664-669, Beijing, China, November 1992.
65. Hakim, M. M., and J. H. Garrett, Jr., "Object-Oriented Representation of Engineering Knowledge and Data: Pros and Cons," Proceedings of the 1992 Artificial Intelligence in Engineering Conference (AIENG92), D. A. Grierson, G. Rzevski, R. A. Adey, eds., Elsevier Applied Science, pp. 21-34, , Waterloo, Canada, July 1992.
66. Bullock, D., J. H. Garrett, Jr., C. T. Hendrickson, and A. Pearce, "A Neural Network for Image-Based Vehicle Detection," Proceedings of the International Conference on Artificial Intelligence Applications in Transportation Engineering, S. G. Ritchie and C. T. Hendrickson, eds., pp. 235-251, San Buenaventure, CA, June 1992.
67. Garrett, Jr., J. H., "Neural Networks and their Applicability within Civil Engineering," Proceedings of the Eighth ASCE Conference on Computing in Civil Engineering, pp. 1155-1162, Dallas, TX, June 1992.
68. Hakim, M. M., and J. H. Garrett, Jr., "A Design Component Library based on Design Standards," Proceedings of the Eighth ASCE Conference on Computing in Civil Engineering, pp. 105-112, Dallas, TX, June 1992.
69. Hakim, M. M., and J. H. Garrett, Jr., "Issues in Modeling and Processing Design Standards," Proceedings of the Joint CIB Workshops on Computers and Information in Construction, pp. 242-257, Montreal, Quebec, Canada, May 1992.
70. Hakim, M. M., and J. H. Garrett, Jr., "An Environment for Modeling Engineering Design Standards," Proceedings of the 1992 NSF Design and Manufacturing Systems Conference, pp. 331-336, Atlanta, GA, January 1992.
71. Rehak, D. R., and J. H. Garrett, Jr., "Structural System Control using Neural Networks," Proceedings of the Eighth Conference on Computing in Civil Engineering, pp. 864-871, Dallas, TX, June 1992.
72. Halim, I. S., W. H. Tang and J. H. Garrett, Jr., "Knowledge-Assisted Interactive Probabilistic Site Characterization," Proceedings of the 1991 ASCE Geotechnical Engineering Congress, pp. 264-275, Boulder, CO, June 1991.
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74. Yau, N. J., J. Melin, J. H. Garrett, Jr., and S. Kim, "An Environment for Integrating Building Design, Construction Scheduling, and Cost Estimating," Proceedings of the Seventh ASCE Conference of Computing in Civil Engineering, pp. 222-232, Washington, D.C., May 1991.

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77. Garrett, Jr., J. H., S. C-Y. Lu, J. B. Thompson, and A. E. Herman, "Applications of Artificial Intelligence Techniques to Engineering Design at the University of Illinois at Urbana-Champaign," Proceedings of the 1990 Conference on Artificial Intelligence in Engineering (AIENG90), pp. 261-280, Boston, MA, June 1990.
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79. Wu, X, J. H. Garrett, Jr., and J. Ghaboussi, "Representation of Material Behavior: Neural Network-based Models," Proceedings of the 1990 International Joint Conference on Neural Networks, Vol. 1, pp. 229-234, San Diego, CA, June 1990.
80. Garrett, Jr., J. H., and M. Maher Hakim, "A Formal Model of Engineering Design Standards," Proceedings of the 1990 NSF Design and Manufacturing Systems, pp. 39-46, Tempe, AZ, January 1990.
81. Ghaboussi, J., J. H. Garrett, Jr., and X. Wu, "Material Modeling with Neural Networks," Proceedings of NUMETA 90 - the International Conference on Numerical Methods in Engineering: Theory and Applications, Vol. II, G. N. Pande and J. Middleton, eds., Elsevier Applied Sciences, pp. 701-717, Swansea, U. K., January 1990. ( Invited presentation)
82. Garrett, Jr., J. H., "Object-Oriented Representation of Design Standards," Proceedings of the International Association of Bridge and Structural Engineers (IABSE) Colloquium on Expert Systems in Civil Engineering, pp. 373-382, Bergamo, Italy, October 1989.
83. Garrett, Jr., J. H., "An Object-Oriented Representation of Design Standards," Proceedings of the Sixth ASCE Conference on Computing in Civil Engineering, pp. 267-274, Atlanta, GA, September, 1989.
84. Benekohal, R., J. H. Garrett, Jr. and J. Linkenheld, "PHAST - A Knowledge-Based Traffic Control System," Proceedings of the Twelfth Annual Pittsburgh Conference on Modeling and Simulation, Vol. 20, Part 1, pp. 357-363, Pittsburgh, PA, May 1989.
85. Garrett, Jr., J. H., J. Basten, J. Breslin and T. Andersen, "An Object-Oriented Model for Building Design and Construction," Computer Utilization in Structural Engineering, Proceedings of the 1989 ASCE Structures Congress VII, James K. Nelson, Ed., pp. 332-341, San Francisco, CA, May 1989.
86. Garrett, Jr., J. H., J. Basten, J. Breslin, "An Object-Oriented Model for Building Design and Construction," in Proceedings of the USACERL/ASCE First Joint Conference on Expert Systems, No. P-89/10, pp. 30-35, U. S. Army Construction Engineering Research Laboratory, Champaign, IL, January 1989.
87. Fenves, S. J. and J. H. Garrett, Jr., "Standards Representation and Processing," in Proceedings of the International Association of Bridge and Structural Engineers (IABSE) Conference *Steel in Buildings*, pp. 107-114, Luxembourg, September 1985.

88. Garrett, Jr., J. H., G. Haaijer, K. H. Klippstein, "Evaluation of Elastically Restrained Compression Flanges of Cold-Formed C-Shaped Sections," *Recent Research and Developments in Cold-Formed Steel*, pp. 1-23, St. Louis, MO, November 1984.
89. Garrett, Jr., J. H., G. Haaijer, K. H. Klippstein, "Effective Lengths for Laterally Unbraced Compression Flanges of Continuous Beams Near Intermediate Supports," *Recent Research and Developments in Cold-Formed Steel Design and Construction*, pp. 179-210, St. Louis, MO, November 1982.

### 3.E. Sections or Chapters in Edited Monographs or Similar Volumes

1. Kiliccote, Han and James H. Garrett, Jr., Agents for Standards Processing, Chapter 10 in *Agents and Multi-Agent Systems in Construction*, J. Ugwu, C. Anumba and R. Zen, eds., Taylor and Francis, in press for 2005
2. Hammad, A., Garrett, J.H., and Karimi, H.A. (2004), "Location-Based Computing for Infrastructure Field Tasks, Chapter 10 in *Telegeoinformatics: Location-Based Computing and Services*, Karimi, H.A.and Hammad, A. (Editors). Taylor & Francis, pp. 287-314.
3. Sriram, D. and J. H. Garrett, Jr., "Neural Networks," Chapter 8 in *Intelligent Systems for Engineering: A Knowledge-based Approach*, D. Sriram, Ed., Springer-Verlag, expected publication in 1997.
4. J. H. Garrett, Jr., D. J. Gunaratnam, and N. Ivezic, "Introduction," Chapter 1 in an ASCE Monograph on the *Application of Artificial Neural Networks in Civil Engineering*, I. Flood, N. Kartam and J. H. Garrett, Jr. Eds., submitted in October 1994, expected publication in Jan. 1997.
5. Rehak, D. R., and J. H. Garrett, Jr., "Neural Computing for Intelligent Structural Systems," *Intelligent Structures?2: Monitoring and Control*, pp. 147-161, Y.K. Wen, ed., Elsevier, 1992.
6. Garrett, Jr., J. H., Ghaboussi, J., Wu, X. "Neural Networks," Chapter 6 in the ASCE Monograph Knowledge Representation, pp. 104-143, R. Allen, ed., 1992.
7. Garrett, Jr., J. H., Ranjithan, S. and Eheart, J. W. "Application of Neural Networks to Groundwater Remediation," Chapter 11 in the ASCE Monograph Knowledge Representation, pp. 259-269, R. Allen, ed., 1991.
8. Maher, M. L., S. J. Fenves, and J. H. Garrett, Jr., "Expert Systems in Structural Design," in *Expert Systems in Construction and Structural Engineering*, pp. 85-122, H. Adeli, ed., Chapman and Hall, 1988.

### 3.F. Published Abstracts, Discussions, Reviews

1. Garrett, Jr., J. H., "Texts and Reference Books on Expert Systems and Artificial Intelligence," Chapter 12 in *Teaching Knowledge-Based System Techniques*, pp. 82-94, S. Mohan and M. L. Maher (eds.), American Society of Civil Engineers, 1990.

### 3.G. Other Writings

1. Garrett, Jr., J. H., "An Object Oriented Model for Building Design and Construction," Technical Report No. 89-37-04, Advanced Construction Technology Center, University of Illinois at Urbana- Champaign, Urbana, IL, January 1989.  
**Content:** A detailed technical report describing an object-oriented building model developed as part of a research project.

- Garrett, Jr., J. H. and S. J. Fenves, "SPEX - A Knowledge-Based Standard Processor for Structural Component Design," Technical Report No. R-86-157, Department of Civil Engineering, Carnegie Mellon University, Pittsburgh, PA, September 1986.  
**Content:** Garrett's Ph.D. Thesis.

### **3.H. Discussion or Reviews**

### **3.I. Patents**

- Patent for *Neural Network-based Vehicle Detection System and Method*, Patent No. 5,448,484, issued on September 5, 1995. Patent co-held with Darcy M. Bullock and Chris T. Hendrickson.
- Provisional Patent for an Interface for Construction Dataport: Construction Drawings for use on a Construction Site, Co-inventors J. H. Garrett, Jr. and R. Steeb

## **5. Professional Activities**

### **5.A. Seminars**

A Nervous System for our Infrastructure, Invited Lecture, IBM Research, March 9, 2009.

A Nervous System for our Infrastructure, Distinguished Lecture, University of Texas Austin, Department of Civil, Architectural and Environmental Engineering, November 11, 2008.

Proactive Sensor Data Driven Management of Infrastructure Systems, delivered at the PSC (May 2006), Qatar (June 2006) and Trinidad and Tobago (August 2006), DC CMU Alumni Group (January 2007), KAIST (June 2007).

Advanced Infrastructure Systems Research at Carnegie Mellon, Invited Lecture at the Department of Civil and Environmental Engineering, University of Michigan, October 2006.

"An Overview of the Research in Mobile/Wearable Computer-Aided Engineering Systems," Invited Presentation to the IMAC Lab, Swiss Federal Institute of Technology, July 14, 2003.

"ASDMCon: Advanced Sensor Based Defect Detection and Management at Construction Sites, Invited Presentation to the IMAC Lab, Swiss Federal Institute of Technology, July 25, 2003.

"A Summary of the Vision and Directions for IT in Civil Engineering", Invited Keynote at the Fourth Joint International Symposium on Information Technology in Civil Engineering: Towards a Vision for Information Technology in Civil Engineering, November 16, 2003.

"An Overview of the Research in Mobile/Wearable Computer-Aided Engineering Systems in the Advanced Infrastructure Systems Lab at Carnegie Mellon University," Invited Keynote Lecture at the Bauen mit Computern (Computer-Aided Construction) Conference, Bonn, Germany, April 11-12, 2002.

"Mobile and Wearable Computing for Construction Sites: Opportunities, Challenges and Examples," Hochtief Research, Essen, Germany, October 2001, invited.

"Enabling Technologies and Innovative Sensor Systems for Monitoring Built Infrastructure," German American Frontiers of Engineering, Essen, Germany, October 2001, invited.

"Ubiquitous Computing for the Constructed Infrastructure: Needs and Opportunities," Department of Mechanical Engineering, Lehigh University, March 2001, invited.

"Mobile and Wearable Computing for Construction Sites: Opportunities, Challenges and Examples," Department of Civil Engineering, Bauhaus University, Weimar, Germany, March 2001, invited.

"Issues in Delivering Mobile IT Systems to Field Users," Keynote Address at IKM 2000: International Colloquium on the Applications of Computer Science and Mathematics in Architecture and Civil Engineering, June 2000.

"Embedded Microdevices for Infrastructure Monitoring," Transportation Research Board, January 2000

"Issues in Delivering Mobile IT Systems to Field Users," Keynote Address at IKM 2000: International Colloquium on the Applications of Computer Science and Mathematics in Architecture and Civil Engineering, June 24, 2000.

"Ubiquitous Computing for Civil Infrastructure," University of Cairo, October 9, 1999

"MEMS-Based Devices for Civil Infrastructure Monitoring", Brief Presentation of Research at the IABSE Annual Meetings BASAAR, Rio de Janeiro, Brazil, August 26, 1999

"MEMS Applications for Civil Infrastructure," Presentation to the Intelligent Infrastructure Institute at Drexel, May 5, 1999.

"CAE Research Related to MEMS/Wearable Computers at CMU," Michael Baker Corp, March 3, 1999

"Wearable Computers for Supporting Field Operations," DOE MMS, Hearndon, VA, January 26, 1999

"Wearable Computers for Supporting Field Operations," General Dynamics Electric Boat, Groton, CT, January 6, 1998

"Human Centered Issues of Wearable Computers for Supporting Bridge Inspectors," presented on November 12, 1997 at the NAB Workshop (sponsored by the NSF, Army Research Office and the Bechman Institute), Washington, D. C.

"Wearable Computers for Supporting Bridge Inspectors," Michael Baker Project Managers Workshop, Coraopolis, PA. November 14, 1997

"Wearable Computers for Supporting Bridge Inspectors," presented on September 30, 1997 at the Virginia Bridge Inspector Workshop, held in Whythville, VA.

"Computer-Aided Engineering: Past, Present and Future," Ecole Polytechnique Federal Lausanne (EPFL), Lausanne, Switzerland, September 12, 1997.

"Environmental Regulation Broker", Brief Presentation of Research at the IABSE Annual Meetings BASAAR, Innsbruck, Austria, September 16, 1997

"Wearable Computers for Bridge Inspection", Brief Presentation of Research at the IABSE Annual Meetings BASAAR, Innsbruck, Austria, September 16, 1997

"The Computer-Aided Engineer: Prospects and Risks," presented on May 16, 1996 for the Pittsburgh Chapter of ASCE Computer Practices.

"A WWW-Based Regulations Broker," presented at a workshop sponsored by IBM to showcase the work being done at Carnegie Mellon University. March 18, 1996, Washington, D. C.

"Neural Networks: What Are They? Where Are They Being Applied? Why Should Engineering Be Interested?", presented as an invited lecture at Pitt University, Department of Industrial Engineering, October 13, 1994.

"Neural Network Applications in Civil Engineering", presented as an invited lecture at the Università Degli Studi di Trento (University of Trento), Trento, Italy, July 6, 1994.

"Class-Centered vs. Object-Centered Approaches for Modeling Engineering Design Information," Presented at the following universities on the following dates:

Universität Karlsruhe	March 11, 1994
IKM Colloquium, Weimar Germany	March 17, 1994
Technical University of Denmark	April 21, 1994
University of Lund (Sweden)	April 22, 1994
EPFL (Lausanne)	April 29, 1994
Ruhr Universität Bochum	May 9, 1994
Technische Hochschule Darmstadt	May 10, 1994
Technische Universität Berlin	May 19, 1994
Technische Universität München	July 12, 1994

"Neural Networks for NDT of Railroad Ties," A 7 week project conducted as part of the University's Program, funded by NSF, for Careers in Science & Technology (CAST) June/July 1993.

"Computer-Based Representation and Processing for Building Codes," Presented as a seminar at the 1993 CAAD Futures Conference, July 8, 1993

"Neural Networks in Engineering," Presented as part of the 1993 Bosch Course held at Carnegie Mellon University, July 2, 1993.

"Expert Systems in Engineering," Presented as part of the 1993 Bosch Course held at Carnegie Mellon University, July 1, 1993.

"An Overview of Applied Neural Network Research at Carnegie Mellon University," an seminar given at the 1993 Ohio Neural Network Workshop sponsored by NASA/Lewis and the Ohio Aerospace Institute, June 14, 1993.

"Neural Networks and their Applications within Civil Engineering," a tutorial presented at the Fifth Conference on Computing in Civil Engineering, June 6-9, 1993, Anaheim, CA

"Neural Networks and their Applications within Engineering," a tutorial presented at the Military Technical University in Warsaw, Poland, May 6, 1993.

"Computer-based Models of Standards," a presentation within the Research Needs and Priorities Session at the 1993 Structures Congress, April 20, 1993.

"A Neural Network-based Approach to Design Synthesis Knowledge Acquisition and Use," a talk presented to the Industrial Management Department of the University of Pittsburgh, March 30, 1993.

"Standards Processing: An Overview and Discussion of Potential in Manufacturing," a talk presented to the DFM Lab of EDRC, March 29, 1993.

"A Neural Network-based Approach to Design Synthesis Knowledge Acquisition and Use," a talk presented at a Joint US-Japan Workshop on Expert Systems in Engineering, Sponsored by the Expert Systems and Artificial Intelligence committee of the ASCE and the Japanese Society of Mechanical Engineering, August 25-26, 1992, Tokyo, Japan.

"Neural Networks and their Applications within Civil Engineering," a talk presented at the Indian Institute of Technology - Delhi, Dept. of Civil Eng., March 5, 1992 New Delhi, India "Neural Networks and their Applications within Civil Engineering," a talk presented at the USDOE Pittsburgh Energy Technology Center, April 8, 1992.

"Expert Systems in Structural Engineering," a tutorial presented at the Congress of the International Association of Bridge and Structural Engineers, March 5, 1992, New Delhi, India

"Neural Networks and their Applications within Civil Engineering," presented at the State University of New York, Buffalo, January 24, 1992 Buffalo, New York.

"An Introduction to Neural Networks," a tutorial presented at the 1992 Transportation Research Board Conference, January 15, 1992, in Washington, D.C.

"An Introduction to Neural Networks," a tutorial presented at the Second International Conference on Applications of Advanced Technologies in Transportation Engineering, Minneapolis, Minnesota, August 1991.

"An Engineers Wishlist for Machine Learning," presented as part of a panel discussion at Machine Learning '91 held in Evanston, IL, July 1991.

"Simultaneous Engineering and The Construction Industry," presented at the Allerton Honors Conference, March 9-10, 1990, held at the Allerton House, University of Illinois at Urbana-Champaign.

"Knowledge-Based, Object-Oriented Standards Processing," presented as part of the Center for Building Technology Lecture Series at the National Institute of Standards and Technology (NIST), August 8, 1989.

"Knowledge-Based Standards Processing," presented as part of the Lecture Series of the Center for Integrated Facility Engineering (CIFE) at Stanford University, May 15, 1989.

"Knowledge-Based Systems Research in Structural Engineering," presented as part of a panel discussion on Knowledge-Based Systems in Civil Engineering at the National Conference of the American Society of Civil Engineering held in October 1988, St. Louis, MO.

## **5.B. Government Committees, Civic Appointments, Board Memberships**

Appointed a member of the External Review Board for the Architecture and Civil Engineering Program (ENAC) at the Ecole Polytechnique Federale Lausanne (EPFL) (2006)

Appointed to the NRC Panel to review the NIST Building and Fire Research Laboratory (2000-2001)

Appointed Member, Shaler Township Zoning Hearing Board, September 1991 - December 1993. Met once a month to hear requests for variances of zoning laws within the township of Shaler.

## **5.C. Membership & Activities in Honorary Fraternities, Professional Societies**

Member, American Society of Civil Engineers (ASCE)

Technical Council on Computer Information Technology (TCCIT)

- Expert Systems Committee

- Database Committee (Secretary: 1992-1994)

Structural Engineering Institute

- Emerging Computing Technology (Chair: 1991-1996)

Member, International Association of Bridge and Structural Engineers (IABSE)

- Working Group 6, Information Technology

(Chair: 2001-2005, Vice-Chair: 1997-2001, Member: June 1995 - present)

- Technical Committee (Vice-Chair 2005-2008)

Member, American Institute of Steel Construction (AISC) Software Committee (Mar 95 - Dec 97)

Member, Sigma Xi Research Fraternity

Member, International Neural Network Society (INNS)

Member, American Association for Artificial Intelligence (AAAI)

Member, Association for Computing Machinery (ACM)

## **5.D. Editorial Roles on Publications, Major Activities in Professional Meetings**

Elected as co-Editor-in-Chief of the Journal of Computing in Civil Engineering, 2008-present.

Tactical Plan Editor, Intelligent and Automated Construction Job Site element in the Capital Projects Technology Roadmap Initiative, FIATECH, 2003-present.

Associate Editor for the *Journal of Structural Engineering*, October 1997 - October 2000.

Contributing Editor for the *Journal of Computing in Civil Engineering*, September 1995 - May 1998, in charge of Best Paper Award.

Guest Editor (with Ian Smith) for the *IEEE Expert Magazine*, Special Track on "Artificial Applications in Civil Engineering," Vol 11, Nos. 3 and 4.

Guest Editor for the *Journal of Computing in Civil Engineering*, Special Issue on "Neural Networks in Civil Engineering," Vol. 8, No. 2, April 1994.

Guest editor (with M. L. Maher) for the *Journal of Computing in Civil Engineering*, Special Issue on "Knowledge-based Approaches to Design and Planning," Vol. 5, No. 1, Jan. 1991.

#### **5.E. Awards, Prizes, Honors**

- 2007 Steven J. Fenves Award for Systems Research, Carnegie Institute of Technology
- 2007 Professor of the Year, ASCE Pittsburgh Chapter
- 2006 ASCE Computing in Civil Engineering Award, June 2006
- 2002 Journal of Computing in Civil Engineering Best Paper Award for 2001 (Co-recipient with Dr. Han Kiliccote) for a paper entitled: "The Standards Usage Language (SUL): An Abstraction Boundary between Design Systems and Standards Processors."
- 1994 Alexander von Humboldt Research Fellowship. Feb.1-July 31, 1994.
- 1993 Wellington Prize, (Co-recipient with Prof. Rahim Benekohal and Mr. Jeffery Linkenheld), American Society of Civil Engineering, for a paper entitled "Knowledge-based Design of Signalized Intersections."
- 1992 IABSE Prize, International Association of Bridge and Structural Engineers for achievements in applying Expert Systems in Structural Engineering.
- 1990 Moisseiff Award, (Co-recipient with Prof. Steven J. Fenves), American Society of Civil Engineering Journal of Structural Engineering for paper entitled "Standard Independent Member Design".
- 1989 Presidential Young Investigator Award, National Science Foundation.
- 1988 Outstanding Civil Engineering Teacher Award, American Society of Civil Engineers, University of Illinois Student Chapter.

## **5.F. Service on CMU Committees**

### **Departmental Committees:**

Computer Committee (Chair 2006- present; 1990-91)

Facilities Committee (Chair 2006 – present)

Awards Committee (2006 – present)

Strategic Planning Committee (2006 - present)

Publications Committee (2006 – present)

Curriculum Review Committee (member 1990-1993, chair 1998-2000, member 2000-06)

Faculty Search Committees:

2000	CAE
2001-02	Information Technology/Civil Systems
2006	Mechanics, Materials and Computing

### **College Committees:**

Planning Committee for the 1995 Engineering College Research Review (1994-1995)

ABET 2000 Committee (1998-2000)

Core Curriculum Review Committee (1998-2001)

Curriculum Assessment Coordination Committee (Chair 2000-2006)

Curriculum Review Committee (2002-2006)

Chair, BME Head Search Committee (2007)

### **University Committees:**

Diversity Advisory Council (2000-present)

Co-Director of the University Choice Program (1999-present)

University Education Committee (Vice Chair: 1997-1999, member 1997-present)

Faculty Senate Executive Committee (1997-1999)

CSW Advisory Board (1998-2001)

University Student Advisory Committee (1994-1996)

Faculty Senate Advisory Committee on Computing (1993-1994)

University Task Force on Undergraduate Computing (1992-1993)

## **6. Other**

### **6.A. Short Courses Taught**

"Expert Systems for Civil Engineers" 1-day short courses sponsored by the American Society of Civil Engineers held in Boston and New York City on October 3 (Boston) and October 7 (New York).

"Expert Systems for Civil Engineers" Presented prior to the International Association of Bridge and Structural Engineers (IABSE) Colloquium on Expert Systems in Civil Engineering; co-sponsored by IABSE and ISMES, spa. on October 16-17, 1989 in Bergamo, Italy.

"Neural Networks in Engineering" Presented as part of the 1991 Bosch Course held at Carnegie Mellon University.

"Expert Systems in Engineering" Presented as part of the 1992 Bosch Course held at Carnegie Mellon University.

"Neural Networks for Video-Based Vehicle Detection," A 7 week project conducted as part of the University's Program, funded by NSF, for Careers in Science & Technology (CAST) June/July 1992.

"Neural Networks in Engineering" Presented as part of the 1993 Bosch Course held at Carnegie Mellon University.

"Expert Systems in Engineering" Presented as part of the 1993 Bosch Course held at Carnegie Mellon University.

"Neural Networks in Engineering" Presented as part of the 1994 Bosch Course held at Carnegie Mellon University.

"Expert Systems in Engineering" Presented as part of the 1994 Bosch Course held at Carnegie Mellon University.

"Overview of Artificial Intelligence in Engineering" Short course held in Bergamo in March 1995. Sponsored by ISMES, spa. and the IABSE.

"Expert Systems in Engineering" Presented as part of the 1995 Bosch Course held at Carnegie Mellon University.

### **6.B. Student Activities**

Advisor for Student Chapter of Chi Epsilon, the Civil Engineering Honor Society (1991-1998, 2002-present)

Advisor for Student Chapter of Tau Beta Pi, the Engineering Honor Society (1998-2006)

Advisor for ASCE/AISC Student Steel Bridge Team (1996-1998)

Advisor, Future Cities Competition 2002-2004, St. Bede's Middle School