

James H. Garrett, Jr.
Thomas Lord Professor and Department Head
Civil and Environmental Engineering

Curriculum Vitae

January 2, 2012

Department of Civil and Environmental Engineering
Carnegie Institute of Technology
Carnegie Mellon University
Pittsburgh, Pennsylvania 15213-3890
(412) 268-2941

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
5000 Gulf Freeway, Houston, TX 77252

Developed knowledge-based engineering design systems using advanced knowledge-based system environments developed in-house at Schlumberger.

1.E. Consulting Assignments

July 1996 - 2001

Baker Engineering, Inc.
Coraopolis, PA

Presented a short course on Object-Oriented Software Engineering. Consulted with them on the object-oriented design of a bridge rating/design system (OPIS/VIRTIS).

February 1994 - 1999

ERES Consultants
Champaign, IL

Consulted with Dr. Michael Darter and his co-workers on the development of an expert system for pavement design.

November 1993 - 1999

Digital Site Systems, Inc.
Pittsburgh, PA

Consulted with Dr. Farro Radjy concerning the use of neural networks for predicting the properties of curing concrete from sensing data.

March 1986 - May 1986

American Institute of Steel Construction
Chicago, IL

Developed the seated beam connection design tables found in the Load and Resistance Factor Design Specification (LRFD). This work involved researching the methods used to develop the set of tables in the previous version of the Allowable Stress Design (ASD) Specification and then modifying these methods to properly take into account the LRFD methods.

January 1985 - December 1985

Tenera Corporation
Washington, DC

Developed a preliminary specification for a standards representation and processing environment for use by AISC in modeling their LRFD specification. Also developed and demonstrated a prototype of such a system for early project evaluation purposes. AISC has since gone on to redesign and develop such a system, marketed as ELRFD.

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.

Course Number	Course Title	Units	Class	Num. of Students	Offered	FCE Ratings: Course	FCE Ratings: Instr
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	Comp. 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	Comp. 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	Comp. 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	Comp. Decision Support	6	Gr	20	S09	4.3	4.5
12-411	Engineering Economics	6	Sr/Gr	46	F09	3.73	3.92
12-671	Fun. of Comp in CEE (h)	6	Sr/Gr	3	F09	n/a	n/a
12-742	Comp. Decision Support	6	Gr	18	S10	4.38	4.56
12-411	Engineering Economics	6	Sr/Gr	59	F10	4.2	4.46
12-743	Computational Search and Decision Support	6	Gr	21	S11	4.33	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."
8. Russell "Tye" Tutt, CEE, Independent Study on Vehicles as Sensors Project

(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 Determination", 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
16. Mr. Salih Demir (co-advised with Burcu Akinci)

(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, "Modeling 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.
Present Position: Faculty Member, Walailak University, Thailand
11. Dr. Rebecca Buchheit, "VACUUM: An Automated Procedure for Assessing and Cleansing Civil Infrastructure Monitoring Data," May 2002.
Present position:
12. Dr. Christian Buergy, "Interaction Constraints Model for Designing Mobile IT Devices for Industrial Environments," May 2002.
Present position: President, WearableConsult (his company)
13. Dr. Jan Reinhardt, "Navigational Models for Accessing Construction Information On-Site", (Co-advised with Prof. Burcu Akinci), Dec 2003.
Present Position: President, ADEPT (his company)
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, "Automated Defect Detection and Recognition for Wastewater Pipeline Inspection and Condition Assessment", (co-advised with Lucio Soibelman), August 2008,
Present Position: Research Engineer, IBM Research

20. Dr. Michael Bigrigg, “An Integrated Modeling Approach for Affordable Reliability in Infrastructure Systems with Sensor Networks” (co-Advised with Scott Matthews), May 2011

Present Position: Research Scientist, CASOS

21. Dr. Daniel Oliviera, “Spatial Data Analysis of Networked Infrastructure Failure Data: An Application for Condition Assessment of Drinking Water Distribution Systems”, (co-advised with Lucio Soibelman), May 2010.

Present Position: Project Engineer, University of Texas, Austin, Facility Management

22. Dr. Chung-Yan Shih, “Geospatial Decision Support Framework for Critical Infrastructure Interdependency Assessment”, (co-advised with Lucio Soibelman and Scott Matthews), May 2010.

Present Position: Software Systems Engineer, Michael Baker Corporation

23. Ms. Asli Akcamete, “A Formal Approach for Managing Facility Change Information and Capturing Change History as Part of Building Information Models (BIM)”, (Co-advised with Burcu Akinci), August 2011

Present Position: Assistant Professor, Department of Civil Engineering, Middle East Technical University, Ankara, Turkey

24. Mr. Elfatih Ahmed, Using FRP for Suspension Bridge Decks

25. Mr. Saurabh Taneja, (Co-advised with Burcu Akinci)

26. Mr. Salih Demir

27. Ms. Yujie Ying (co-advised with Lucio Soibelman and Irving Oppenheim)

28. Mr. Fernando Cerda (co-advised with Jacobo Bielak)

29. Mr..Xuesong Liu (co-advised with Burcu Akinci)

30. Mr. Eui Jae Jin (co-advised with Burcu Akinci)

31. Mr. Engin Burak Anil (METU Dual Degree Student Co-advised with Burcu Akinci)

32. Ms. In-Soo Jung (co-advised with Mario Berges)

33. Mr. Jun Shi (co-advised with Lucio Soibelman)

34. Mr. Te Gao (co-advised with Semiha Ergan and Burcu Akinci)

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. Ying, Y., J. H. Garrett Jr., J. Harley, I. J. Oppenheim, J. Shi, and L. Soibelman. "Damage Detection in Pipes under Changing Environmental Conditions using Embedded Piezoelectric Transducers and Pattern Recognition Techniques." *Journal of Pipeline Systems Engineering and Practice*, Special Issue for International Conference on Pipelines and Trenchless Technology, in press for publication in 2011.
2. Taneja, S., A. Akcamete, B. Akinci, J. H. Garrett, Jr, L. Soibelman, E. W. East, "Analysis of three indoor localization technologies for supporting operations and maintenance field tasks", in press for ASCE *Journal of Computing in Civil Engineering* (doi:10.1061/(ASCE)CP.1943-5487.0000177).
3. Shahandashti, M.S., S. N. Razavi, L. Soibelman, M. Berges, C. H. Caldas, I. Brilakis, J. Teizer, C. Haas, J. H. Garrett, Jr., B. Akinci, Z. Zhu, "Data Fusion Approaches and Applications for Construction Engineering.," in press for ASCE *Journal of Construction Engineering and Management*.
4. Taneja, S., B Akinci, JH Garrett, L Soibelman, M Berges, G Atasoy, X Liu, SM Shahandashti, EB Anil, E Ergen, A Pradhan, P Tang, "Sensing and field data capture for construction and facility operations," in press for ASCE *Journal of Construction Engineering and Management*.
5. Oliviera, D. P., L. Soibelman, J. H. Garrett, Jr., "A density-based spatial clustering approach for defining local indicators of drinking water distribution pipe breakage," *Journal of Advanced Engineering Informatics, Elsevier*, Vol 25, Issue 2, pp. 380-389, April 2011, ([doi:10.1016/j.aei.2010.09.001](https://doi.org/10.1016/j.aei.2010.09.001)).
6. Oliviera, D. P., D. Neill, L. Soibelman, J. H. Garrett, Jr., "Detection of patterns in water distribution pipe breakage using spatial scan statistics for point events in a physical network," *Journal of Computing in Civil Engineering*, Vol. 25, No. 1, January/February 2011, pp. 21-30, ([doi 10.1061/\(ASCE\)CP.1943-5487.0000079](https://doi.org/10.1061/(ASCE)CP.1943-5487.0000079)).
7. Anthony Rowe, Mario Berges, Gaurav Bhatia, Ethan Goldman, Raj Rajkumar, Lucio Soibelman, James H. Garrett, José M. F. Moura. "Sensor Andrew: Large-Scale Campus-Wide Sensing and Actuation." *IBM Journal of Research and Development*, vol. 55, no. 1, pp. 6:1 - 6:14, 2011
8. Bigrigg, M. W., H. S. Matthews, J. H. Garrett, Jr. "Fault perturbations in building sensor network data streams," *Int. J. Sensor Networks*, Vol. 7, No. 3, 2010
9. Guo, W., L. Soibelman, and J. H. Garrett, Jr. "Visual Pattern Recognition Supporting Defect Reporting and Condition Assessment of Wastewater Collection Systems", *Journal of Computing in Civil Engineering*, Vol. 23, No. 3. pp. 160-169, May/June 2009.
10. Shih, C-Y, C. D. Scown, L. Soibelman, H S. Matthews, J. H. Garrett Jr., K. Dodrill and S. McSurdy, "Data Management for Geospatial Vulnerability Assessment of Interdependencies in US Power Generation", *Journal of Infrastructure Systems*, Vol. 15, No 3, pp. 179-189, September 2009.

11. Chen, P., C. Scown, H. S. Matthews, J. H. Garrett, Jr. "Managing Critical Infrastructure Interdependence through Economic Input-Output Methods", *Journal of Infrastructure Systems*, Vol. 15, No 3, pp. 200-210, September 2009.
12. Bigrigg, M.W., H. S. Matthews, J. H. Garrett, Jr., "Data Imputation using in-exact replicas," *Int. J. Intelligent Systems Technologies and Applications*, Vol. 7, No. 1, 2009
13. Gordon, C., B. Akinci and J. H. Garrett, Jr., "Characterization and Search of Construction Inspection Plan Spaces Developed Using a Component-Based Planning Approach" *Journal of Computing in Civil Engineering*, Vol. 23, No. 4, July/August 2009.
14. Guo, W., L. Soibelman, and J. H. Garrett, Jr. "Automated Defect Detection for Sewer Pipeline Inspection and Condition Assessment," in *Automation in Construction*, vol. 18, no. 5, pp. 587–596, 2009.
15. 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.
16. 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.
17. 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.
18. Gordon, C., B. Akinci and J. H. Garrett, Jr., "A formalism for construction inspection planning." *Automation in Construction*, Vol. 17, Issue 6, pp. 705-718, August 2008.
19. 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.
20. 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.
21. 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.
22. 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.
23. 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 in Civil Engineering*, Volume 19, Number 2, PP. 137-147, 2005.
24. 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.

25. 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.
26. 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.
27. 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.
28. 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.
29. 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.
30. 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
31. 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.
32. 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.
33. 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.
34. 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.
35. 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.
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2. Ying, Y., J. H. Garrett Jr., J. Harley, I. J. Oppenheim, J. Shi, and L. Soibelman. "Damage Detection in Pipes under Changing Environmental Conditions using Embedded Piezoelectric Transducers and Pattern Recognition Techniques." Proceedings of 2011 International Conference on Pipelines and Trenchless Technology, Beijing, China, November 2011

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3.F. Published Abstracts, Discussions, Reviews

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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.
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2. 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.
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3.H. Discussion or Reviews

3.I. Patents

1. 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.
2. 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

4. Grants and Contracts

4.A. Awarded As Principal Investigator

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2. National Institute for Standards and Technology, "Requirements for Creating and Measuring Computer-Processable Versions of Engineering Standards," PIs: Garrett, Akinci, Akin, September 2008 – February 2011, \$200,007.
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15. U.S. Army Construction Engineering Research Laboratory, "Investigating User Issues for an Adaptive Workstation," 1 year, January 1, 1996 - December 31, 1996, \$50,000
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23. U.S. Army Construction Engineering Research Laboratory, "Automated Characterization of CAD User Activity," 1 year, January 1993 - December 1993, \$63,989.
24. National Institute of Standards & Technology, "Processing Formally Represented Building Codes and Standards during the Preliminary Design of Buildings," 1 year, September 1992 - September 1993, \$25,000.
25. Digital Equipment Corporation, Equipment Grant supporting National Science Foundation, Presidential Young Investigator Award, 1 year, June 1992-June 1993, \$47,500.
26. National Science Foundation, Presidential Young Investigator Award 1989, Year 4: "An Environment for Automated Standards Usage," 1 year, June 1992 - June 1993, \$62,500.
27. U.S. Army Construction Engineering Research Laboratory, "Adaptive CAD using Neural Networks," .5 year, June 1992 - October 1992, \$15,000.
28. U.S. Army Construction Engineering Research Laboratory, "Adaptive CAD using Neural Networks," .75 year, January 1991 - October 1991, \$15,000.
29. Digital Equipment Corporation, Equipment Grant supporting National Science Foundation, Presidential Young Investigator Award, 1 year, June 1991-June 1992, \$47,500.
30. National Science Foundation, Presidential Young Investigator Award 1989, Year 3: "An Environment for Automated Standards Usage," 1 year, June 1991 - June 1992, \$62,500.
31. National Science Foundation, Presidential Young Investigator Award 1989, Year 2: "An Environment for Automated Standards Usage," 1 year, June 1990 - June 1991, \$49,500.
32. American Institute of Steel Construction, "Matching Support for NSF PYI on Standards Processing," 2 years, January 1990 - December 1992, \$17,500 (as 3 separate grants).

33. American Association of Railroads (ALRR Center at University of Illinois), "Standards Processing for Railroad Standards," 1 year, September 1989 - July 1990, \$20,000.
34. National Science Foundation, Presidential Young Investigator Award 1989: "An Environment for Automated Standards Usage," 1 year, June 1989 - June 1990, \$25,000.
35. U.S. Army Construction Engineering Research Laboratory, "Knowledge-Based Advisor for Alternative Construction Techniques," 0.75 year, January 1989 - October 1989, \$45,000.
36. National Science Foundation, "Object-Oriented Representation and Knowledge-Based Processing of Design Standards, 2 years, September 1988 - September 1990, \$70,000.

4.B. Awarded As Co-Principal Investigator

1. US Army ERDC, "Indoor Position System using Inertial Navigation to Recalibrate Ambient RF Signaling", PIs: Garrett, Akinci, Soibelman, January 2010 – March 2011, \$235,061.
2. US Army ERDC, "Requirements/Approaches Towards Context-Aware BIM", PIs: Garrett, Akinci, Soibelman, January 2009 – February 2010, \$188,463 (\$182,108 + \$6,355 travel supplement).
3. National Institute for Standards and Technology, "Development of a Framework for Evaluating and Fusing Different Data Capture Technologies to Support Continuous Construction Productivity Analyses and Improvement," PIs: Garrett, Akinci, Soibelman, September 2009 - August 2011, \$249,411.
4. CMU Subcontract to Concurrent Technologies Corporation for work on the project: U.S. Department of Energy (DOE) - Center for Instrumented Critical Infrastructures (CICI): Pipeline Initiative, PIs: Moura, Garrett, Soibelman, Oppenheim, 7/08 – 6/10, \$449,931.
5. National Institute for Standards and Technology, " Identification of Functional Requirements and Possible Approaches for Self-Configuring Building Systems," PIs: Garrett, Akinci, Akin, September 2008 - August 2009, \$260,000.
6. IBM, "A demonstration of Sensor Andrew as a Framework to Support Data Fusion and Integration from multiple Sensor Platforms using IBM's System-S", \$50,000, December 2007- December 2008.
7. Innovative Management and Technical Services (IMTS), "Evolutionary Design Subcontract Project", \$90,000, May 2007-February 2008.
8. National Science Foundation, "Workshop for the Investigation, Documentation and Dissemination of NSF Research Validation Testbeds at the NIST," PIs: Garrett (PI) and Akin, March 2006 - February 2008, \$54,697
9. National Institute for Standards and Technology, "Functionalizing Product and Process models for Embedded Commissioning of Low Energy Buildings," PIs: Akin (PI), Akinci and Garrett, May 2006- September 2008, \$300,000.
10. National Institute for Standards and Technology, "An Integrated Approach for Interpreting and Fusing Building and Mobile Sensor Streams in a Facility Into High-Level Information", PIs: Akin, Akinci (PI) and Garrett, October 2005- September 2007, \$350,000.
11. National Institute for Standards and Technology, "Embedded Commissioning in Operations and Maintenance for Improved Building Performance: Case Studies, Data Modeling and Data

Exchange for Interoperability”, PI: Omer Akin, Co-PIs: Burcu Akinci and James H. Garrett, Jr., 70NANB4D10999, \$200,000, started 9/1/2004, 24 months.

12. National Science Foundation, “Analyzing Critical Infrastructure Dependencies: Security and Survivability Effects in the Service Sectors,” PI: Chris T. Hendrickson, Co-PIs: H. Scott Matthews and James H. Garrett, Jr., CMS-0223255, \$149,247, started September 2002, 18 months.
13. National Science Foundation, "Multidisciplinary Exploratory Research to Exploit Motor Vehicle Information and Communications," PI: Chris T. Hendrickson, Co-PIs: Matthews, Subramanian, Akinci, Garrett, ITR, 1 year, January 1, 2002 - December 31, 2002, \$99,281.
14. National Science Foundation, “ITR/IM+AP: Early Defect Detection and Management of Construction Sites Using Integrated Project Models, Laser Scanners, and Embedded Sensors,” Akinci (PI), \$1,990,000, 5 years, September 1, 2001 – August 31, 2006.
15. Adtranz NA, "Design of a System for Early Detection of Guideway Safety Envelope Incursions," J. Garrett, B. Akinci, C. Paredis, S. Thayer, \$80,000, September 1, 2000 - August 31, 2001, funded. This is a companion project to that funded by PITA.
16. National Science Foundation, "EIOLCA: A Tool to Improve Analysis of Environmental Quality and Sustainability," Co-PIs: J. Garrett, C. Hendrickson, L. Lave, , \$290,000, Sept 1, 1998 - August 30, 2000.
17. National Science Foundation, "Brownfield Development," 3 years, July 1995, \$1,050,554.
18. Federal Highway Administration, Neural Network Tools for Condition Assessment and Decision Making in Bridge Management Systems," 1 year, April 1993 - April 1994, \$52,632.
19. University of Illinois Research Board, "Neural Networks for the Diagnosis of Complex Systems," 1 year, September 1988 - September 1989, \$11,919.
20. University of Illinois Research Board, "Knowledge-Based Traffic Intersection Signalization," 1 year, September 1988 - September 1989, \$9,450.

4.C. Awarded as Faculty Associate

1. PITA Grant Grant (Pennsylvania Infrastructure Technology Alliance), “A prototypical interface for integrated visualization of advanced pipe inspection data,” J. Garrett, B. Akinci, L. Soibelman, September 2008- December 2010, \$58,110.
2. PITA Grant Grant (Pennsylvania Infrastructure Technology Alliance), “Assessment of Leveraging Building Information Monitoring and Control on a Real World Case ,” J. Garrett, B. Akinci, September 2007 - June 2008, \$59,658.
3. PITA Grant Grant (Pennsylvania Infrastructure Technology Alliance), “Continuous Monitoring of a Distributed Pipeline,” J. Garrett, L. Soibelman, H. Sohn, September 2006 - June 2008, \$55,200.
4. PITA Grant Grant (Pennsylvania Infrastructure Technology Alliance), “Sensor Andrew Hardware Proposal Follow On ,” J. Garrett, J. Moura, September 2006 - June 2008, \$55,200.
5. PITA Grant Grant (Pennsylvania Infrastructure Technology Alliance), “Automatic Visual Data Interpretation for Pipeline Infrastructure Assessment,” J. Garrett, L. Soibelman, September 2005- December 2006, \$50,511

6. PITA Grant Grant (Pennsylvania Infrastructure Technology Alliance, "Exploration of Effective Augmented Reality Interfaces for Bridge Inspection, J. Garrett and A. Smailagic, September 2005- December 2006, \$49,827
7. PITA Grant Grant (Pennsylvania Infrastructure Technology Alliance, "In Situ Real-Time Moisture Monitoring of Roofing Systems Using Distributed Nanosensors," O. Akin, M. Sitti, J. Garrett, Sept 2005 – Dec 2006, \$34,987
8. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "Exploration of Necessary Support for Information Access and Communication on Construction Sites for Construction Managers," J. Garrett, A. Smailagic, \$41,971, January 1, 2003 - December 31, 2003.
9. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "Roadway Marking System," S. Thayer, J. Garrett, \$50,000, January 1, 2003 - December 31, 2003.
10. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "Exploring the Use of Speech Control in Mobile IT Support for Field Engineers on Construction Sites," J. Garrett, A. Smailagic, C. Buergy, \$41,000, November 1, 2001 - October 31, 2002.
11. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "Exploring the Use of Commercial Wireless Platforms and Embedded Sensors for Assessing Element Quality on Construction Sites," J. Garrett, M. Patton, B. Akinci, \$25,000, November 1, 2001 - October 31, 2002.
12. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "A Case Study in Modeling Organizational Structure and Operation: The American Red Cross in Pennsylvania," J. Garrett, K. Carley, \$16,000, November 1, 2001 - October 31, 2002.
13. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "Evaluation of RFID Technology for use in Precast Concrete Manufacturing," J. Garrett and M. Patton, \$26,000, September 1, 2000 - August 31, 2001.
14. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "Design of a System for Early Detection of Guideway Safety Envelope Incursions," J. Garrett, B. Akinci, C. Paredis, S. Thayer, \$41,000, September 1, 2000 - August 31, 2001, funded. This is a companion project to that funded by Adtranz.
15. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "Wearable Computer for Bridge Inspection," J. Garrett and A. Smailagic, \$10,296, September 1, 1999 - August 31, 2000.
16. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "MEMS-Embedded Buildings and Structures," J. Garrett and K. Gabriel, \$58,099, September 1, 1999 - August 31, 2000.
17. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "Wearable Computer for Bridge Inspection," J. Garrett and A. Smailagic, \$50,000, July 1, 1998 - June 30, 1999.
18. PITA Grant (Pennsylvania Infrastructure Technology Alliance), "MEMS-Embedded Buildings and Structures," J. Garrett and K. Gabriel, \$79,011, July 1, 1998 - June 30, 1999.
19. PITA Grant (Pennsylvania Infrastructure Technology Alliance), support for work on "Wearable Computer for Bridge Inspection," co-investigator with A. Smailagic, 1 year, July 1, 1997 - June 30, 1998, \$74,614.
20. PITA Grant (Pennsylvania Infrastructure Technology Alliance), support for work on "Environmental Regulation Broker," 1 year, July 1, 1997 - June 30, 1998, \$69,457.

21. CMU Engineering Design Research Center (National Science Foundation funded National Engineering Research Center), support for work on "Neural Network-Based Support for Multi-Agent Collaboration," 1 year, May 1995 - April 1996, \$51,386
22. CMU Engineering Design Research Center (National Science Foundation funded National Engineering Research Center), support for work on "Neural Network-Based Support for Multi-Agent Collaboration," 1 year, May 1994 - April 1995, \$49,585
23. CMU Engineering Design Research Center (National Science Foundation funded National Engineering Research Center), support for work on "NETSYN: Neural Network for Engineering Synthesis Knowledge Acquisition and Use," 1 year, May 1993 -April 1994, \$47,572
24. CMU Engineering Design Research Center (National Science Foundation funded National Engineering Research Center), support for work on "NETSYN: Neural Network for Engineering Synthesis Knowledge Acquisition and Use," 1 year, May 1992 - April 1993, \$45,077
25. CMU Engineering Design Research Center (National Science Foundation funded National Engineering Research Center), support for work on "NETSYN: Neural Network for Engineering Synthesis Knowledge Acquisition and Use," 1 year, May 1991 - April 1992, \$41,672
26. Advanced Construction Technology Center (A DOD URI Funded Center at the University of Illinois at Urbana Champaign), "An Object-Oriented Model for Building Design and Construction," 3.5 years, May 1987 - January 1991, \$145,000.

5. Professional Activities

5.A. Seminars

Smarter Infrastructure in Cities of the Future: Needs, Approaches, Challenges and Opportunities, 2011 International Forum for Shanghai Strategic Planning: Innovation and Transformation, Shanghai, China, December 12-13, 2011 (invited).

A Formal Approach to the Interactions Between BIM and Models of Building Regulations, The 2nd Glodon Summit Forum: BIM Leading Project Management, Beijing, China, July 8-9, 2011 (invited).

Innovations in Building Information Capture and Representation, US-Nigeria International Workshop on INNOVATIVE DESIGN APPROACHES TO SUSTAINABLE BUILDINGS, Abuja, Nigeria, *Invited*, November 29-December 1.

A future challenge for informatics: harnessing massive operational and condition data to better manage the infrastructure life-cycle, International Conference on Computing in Civil and Building Engineering, *Keynote Address*, Nottingham, UK, July 2010.

SensorAndrew: A *virtual instrument* for large-scale sensing and actuation that enables sensor-based decision support for built infrastructure, IBM Research, December 1, 2009. (invited)

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

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 to the Expert Panel evaluate the NSF Funded National Earthquake Engineering Simulation (NEES) program, Science and Technology Policy Institute/Institute for Defense Analysis 2011.

Appointed to College of Engineering Advisory Board at Northeastern University, 2011.

Appointed to the Department of Architectural Engineering Advisory Board at The Pennsylvania State University, 2011.

Appointed a member of the External Examination Committee for the Civil and Environmental Engineering Program at the Queens College Cork, June 2009.

Appointed a member of the External Review Board for the Research Activity of the Civil and Environmental Engineering Program at the Queens College Cork, October 2008.

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, Executive Board of the International Bridge Conference (IBC), 2007-present

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

co-Editor-in-Chief of the ASCE *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, 2003-2004.

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

Contributing Editor for the ASCE *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

- 2010 Awarded the Thomas Lord Professorship of Civil and Environmental Engineering, Carnegie Mellon University
- 2009 Elected to ASCE Fellow Status
- 2007 Steven J. Fenves Award for Systems Research, Carnegie Institute of Technology, Carnegie Mellon University
- 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:

Design Review Committee (2009-present)
Faculty/Staff Campaign Committee (2009-present)
Diversity Advisory Council (2000-2006)
Co-Director of the University Choice Program (1999-2000)
University Education Committee (Vice Chair: 1997-1999, member 1997-2000)
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)

NCAA Faculty Athletics Representative for CMU (August 2008-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