## 1.    GENERAL INFORMATION

Email: Paul.Fishwick@utdallas.edu
Web: http://www.utdallas.edu/atec/fishwick/
Work Phone: (972) 883-4389

## 2.    DESCRIPTION OF JOB DUTIES

Teaching, service and research at the University of Texas at Dallas as Distinguished Chair of Arts and Technology (ATEC) and Professor of Computer Science (CS).

## 3.    AREAS OF SPECIALIZATION

Computer Simulation Modeling Methodology and Application, Serious Gaming, Aesthetic Computing

## 4.    RECENT ASSIGNED ACTIVITY (2002-2010)

|          | 2009-10 | 2007-08 | 2006-07 | 2005-06 | 2004-05 | 2003-04 |
|----------|---------|---------|---------|---------|---------|---------|
| Teaching | 45%     | 32%     | 45%     | 58%     | 50%     | 55%     |
| Research | 39%     | 68%     | 40%     | 27%     | 35%     | 35%     |
| Service  | 16%     | 0%      | 15%     | 15%     | 15%     | 10%     |
| TOTAL    | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    |

|          | 2002-03 | 2001-02 | 2000-01 | 1999-00 |
|----------|---------|---------|---------|---------|
| Teaching | 46%     | 52%     | 65%     | 55%     |
| Research | 39%     | 38%     | 25%     | 35%     |
| Service  | 15%     | 10%     | 10%     | 15%     |
| TOTAL    | 100%    | 100%    | 100%    | 100%    |

## 5.    EDUCATIONAL BACKGROUND

| | | | |
|---|---|---|---|
| University of Pennsylvania | Computer and Information Science | PhD | 1986 |
| College of William & Mary | Applied Science | MS | 1983 |
| Pennsylvania State University | Mathematics | BS | 1977 |

**6.      EMPLOYMENT**

University of Texas at Dallas, Distinguished Chair of Arts and Technology
nd Professor of Computer Science                                    2013 - present

| | | |
|---|---|---|
| University of Florida | Professor (tenured) | 1998 – 2012 |
| University of Florida | Associate Professor (tenured) | 1991 – 1998 |
| University of Florida | Assistant Professor (tenure accruing) | 1986 – 1991 |
| University of Pennsylvania | Research Assistant (non-tenure accruing) | 1984 – 1986 |
| University of Pennsylvania | Teaching Assistant (non-tenure accruing) | 1983 – 1984 |
| NASA Langley Research Center | Systems Analyst | 1981 – 1983 |
| Newport News Shipbuilding & Dry Dock Co. | Programmer Analyst | 1978 - 1981 |

**7.      TEACHING, ADVISING AND/OR INSTRUCTIONAL ACCOMPLISHMENTS**

Created curricula around the multi-user environment Second Life in 2006. The use of this environment promotes social networking, "game-oriented synthetic environment creation, and a platform for supporting distance education (i.e., EDGE).

Initiated and directed the department's Digital Arts & Sciences (DAS) undergraduate and graduate programs since its inception in 2000. The DAS program's goals are to link the arts with computer science, and I worked closely with the Colleges of Fine Arts and Engineering during the inception of the program. Key program statistics are: (a) the undergraduate DAS program has continually grown even during the CS "recession", and now represents roughly one fifth of the CISE undergraduate population and (b) the number of females in the DAS program is around 28% compared with 12% for the CEN program.

Designed the DAS program curricula, including the "DAS core" courses: DAS Senior Project class, Introduction to Digital Arts and Science, Theory and Practice of Multimedia, Mathematics, Art & Computing, Interactive Modeling and Animation (two courses: one for modeling and the other for animation).

Designed and taught the computer simulation courses (CAP 4800 and CAP 5805) as well as Aesthetic Computing (CAP 4403 and CAP 6402).

Wrote a book in 1994 (Simulation Model Design and Execution: Building Digital Worlds, Prentice Hall), created from notes from CAP 4800 and C 5805. The book presented a

unique way of understanding modeling and simulation from a computer science perspective based on programming language design principles.

Built a simulation toolkit for use in CAP 4800 and CAP 5805 (SimPack). SimPack has undergone several iterations: SimPack (C Language) SimPack++ (C++ language) and SimPackJ (Java language). SimPack's primary goal is to support programming of discrete event simulations with basic support for numerical integration.

Co-edited, with Richard Newman in 1987, the existing graduate program. This program prior to 1987 emphasized an applications-focus (AI, database systems and software engineering) which was reflected in the core course offerings as well as the PhD qualifying examination core. We recommended a new focus to emphasize fundamental areas of computer science: analysis of algorithms, programming language principles, operating systems and architecture.

**8.     TEACHING EVALUATIONS – instructor average: 4.3 on a range between 1 and 5, with 5 being the highest.**

**9.     GRADUATE COMMITTEE ACTIVITIES  (since 2003) – contains student information (not in this public CV)**

**10.    CONTRIBUTION TO DISCIPLINE/RESEARCH NARRATIVE**

## Contribution

Fishwick's pioneering contribution has been the development of formalisms, methods, and software for interconnecting dynamic system model components within the context of the human-computer interface. This contribution represents a *generalization of the web hyperlink to dynamic system modeling*. He has 6 publications in excess of 135 citations

Allowing the dynamic modeler to link a compartmental model of the heart with a geometric mesh model of the heart, for example, is a problem that connects three model types: dynamic system model, geometric mesh anatomical model, and semantic network. The importance of this linking of models is that it makes the models easier to comprehend, and facilitates domain-specific model-based training. A novel and unique feature of the approach proposed by Fishwick is its incorporation of semantic web approaches to interconnect dynamic system models from different professional cultures within one human-computer interface.

Fishwick began his career defining the role of abstraction in model design [Refs. I.1, I.2, and II.1] and defining how multiple models can be interconnected within a web framework [Ref. I.3]. He developed a theory of system modeling based on model syntax [Refs. I.1 and II.2], which corresponds to programming language categories. This laid the foundation for treating models as media constructs, creating a language-based approach to system model linkage. He advanced the importance of qualitative methods [Refs. II.5 and II.6], which recently resulted in the most comprehensive view of dynamic system modeling [Ref. II.3]. This publication included two chapters on dynamic model linkage and specified system models frequently used as the basis for such linkage. Most recently, he has developed interconnecting models within the human interface [Refs. II.7, II.8, II.9, and II.10]. This research resulted in new techniques for interconnecting system models within other model types (e.g., data, mesh, ontology) as well as

hardware (GPU)-level model linkage to reduce queuing model execution time [Ref. II.4]. The research also relates to the construction of a new field that Fishwick initiated, *Aesthetic Computing* [Ref. II.10] dedicated to mining and representing web information. The importance of Aesthetic Computing is that it defines interactive inter-model linkage techniques used for system representations that engage broad audiences by leveraging principles of intermedia defined within design and the arts.

## Impact on Society

The stated research contribution in model inter-linkage was used to *formulate, evolve, and audit* the Computer Standards of the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM). These standards, as well as the Report of Activities (ROA) in which the standards reside, have been derived directly from Fishwick's dynamic model inter-linkage research contribution. Industry modelers who must comply with these standards are required to express formal linkages, through mandatory forms and documents, interactively connecting dynamic system model information.

In terms of societal relevance, recently (2007), insurance premiums for homeowners and commercial residential businesses within Florida totaled $15.2 billion dollars. A significant portion of these premiums is spent on loss from hurricane wind events. Prior to Fishwick's work in the Computer Standards starting in 1995, there were no certified catastrophe models. State agencies used informal, and often highly inaccurate, methods to evaluate industry rate increase requests to the Office of Insurance Regulation (OIR). But now, the ROA, which includes the Computer Standards developed through Fishwick's research, results in rate changes that are provably fair to both the insurer and the consumer. Hawaii, Louisiana, North Carolina, and South Carolina use Florida's standards and certification process, and therefore Fishwick's research has had nationwide impact with regard to catastrophe risk assessment and insurance premiums paid by consumers.

Fishwick's system model inter-linkage work has resulted in 2008 of one Mixed Simulator Patent (UF-630) with co-inventors from the College of Medicine, and a provisional patent in 2011. In terms of citation indexes, Fishwick has an **h-index of 32** and **g-index of 57** (Harzing's Publish or Perish). Fishwick has 6 publications exceeding 136 citations each. Fishwick's book (where model inter-linkage is elaborated) has 556 citations. Fishwick also constructed SimPack software and maintained it for 15 years, with the seminal SimPack paper having 139 citations.

## PART I: Three Most Important Items

1. **Simulation Model Design and Execution,** Paul A. Fishwick, Prentice Hall, 1995.

   The only simulation textbook with a computer science (rather than analytic/statistical) focus predicated on the use of syntax as a means for creating simulation model categories. This book covers material that resulted in the research contributions related to model component linkage. It introduced a taxonomy of models that departs from the more traditional discrete-event, continuous-time, and continuous-space categories. The taxonomy was based on an equivalent breakdown of programming languages: declarative, functional, and constraint. By rephrasing and defining dynamic system models in terms of program-theoretic terms, Fishwick was the first to forge a connection between programming taxonomy and dynamic system modeling. Methods for formally inter-relating models and components are detailed in a chapter on multimodeling. **556 citations** (Feb 2012)

2. **A Multimodel Methodology for Qualitative Model Engineering**, Paul A. Fishwick and Bernard P. Zeigler. ACM Transactions on Modeling and Computer Simulation, 1992, 2(1): 52-81.

   A paper resulting from a dissertation on the role abstraction plays in modeling for computer simulation, not only at the level of formal process description but also in *how humans interact* and connect diverse model components—how models are visualized at each abstraction level. The defined models each have levels of detail in mathematical system specification. **137 citations** (Feb 2012)

3. **Web-Based Simulation: Some Personal Observations,** Paul A. Fishwick. In Proceedings of the 1996 Winter Simulation Conference, San Diego, CA, December 1996. 764-771.

   A paper that launched 9 subsequent conferences, workshops, and sessions on web-based simulation. The concept of web-based modeling and simulation opens up challenges that are related to framing models, simulations, and their input/output as web constructs. **183 citations** (Feb 2012)

## PART II:  Selected Publications

### Model Design and Execution for Simulation

1. Paul A. Fishwick. "Heterogeneous Decomposition and Inter-Level Coupling for Combined Modeling", In Proceedings of the 1991 Winter Simulation Conference, December 1991, Phoenix, AZ, pp. 1120-1128.

   The first paper on the concept of *multimodeling*, which is the use of multiple abstract models of a dynamic process with formal methods for navigating among abstraction levels for different simulation goals. The kernel idea of multimodeling is that multiple models are often required when studying phenomena, and there need to be methods for moving among models, and formally translating between them, and visually navigating the linkage among components.

2. Paul A. Fishwick. A Taxonomy for Simulation Modeling Based on Programming Language Principles", IIE Transactions 30: 811-820, 1996.

   Introduced and carefully refined the concept of simulation modeling from a language perspective. Models are defined, like programs, as having syntax and semantics, and can be similarly categorized. Using an approach where categories are formed via syntax, former divisions found in the simulation community (discrete vs. continuous) become blurred since the model structures (for example)  of a queuing model and a continuous-time data flow model are nearly identical.

3. Paul A. Fishwick, Ed., Handbook of Dynamic System Modeling, CRC Press 2007.

   The most comprehensive volume on modeling for dynamic systems—covering a variety of model types as well as models that are executed with discrete event scheduling, continuous time integration, and hybrid methods. The book starts with a firm philosophical grounding for modeling based on language, provides a diagrammatic and

mathematical basis, and covers two major application case studies.

4. Hyungwook Park and Paul A. Fishwick, An Analysis of Queuing Network Simulation using GPU-Based Hardware Acceleration. ACM Transactions on Modeling and Computer Simulation, accepted (9/14/2010).

    First successful use of GPUs to simulate an irregular time slice category of system: queuing system models. Involves detailed analysis of accuracy/speedup tradeoff.

**Knowledge, Web-Based, and Qualitative Simulation**

5. Paul A. Fishwick and Paul A. Luker, Eds Qualitative Simulation Modeling & Analysis, with a foreword by Herbert Simon, Springer Verlag, 1991.

    The first edited volume, defining qualitative methods as relevant for the computer simulation community. Methods defining nominal value mapping, fuzzy set theory for simulation, and the bridge between qualitative and quantitative methods were introduced. Herbert Simon, who won the Nobel Prize in Economics in 1978, wrote in the foreword for Qualitative Simulation: "I do suggest that an understanding of qualitative reasoning in this "classical" domain may be a first step toward understanding how we can reason qualitatively about chaos – about systems, for example, whose behavior diverges with the slightest shift in initial conditions."

6. Paul A. Fishwick and Richard B. Modjeski Eds. Knowledge-Based Simulation: Methodology and Application, Springer Verlag, 1991.

    This book was one of the first volumes to bring together researchers in a new hybrid area between AI and simulation. The book is an archive of cross-fertilization workshops and conferences co-organized by Fishwick in the bridge area.

**Role of Human Interaction in Dynamic System Model Design**

7. John Hopkins and Paul A. Fishwick, "Synthetic Human Agents for Modeling and Simulation", Proceedings of the IEEE, 89(2), February 2001, pp. 131-147.

    The use of analogy and metaphor in constructing a 3D model of an operating system, using virtual humans as jobs to be processed, and rooms for operating system functions. This paper served as a first link between simulation modeling and the field of visual programming languages.

8. Paul A. Fishwick, Toward an Integrative Multimodeling Interface: A Human-Computer Interface Approach to Interrelating Model Structures, SCS Transactions on Modeling and Simulation, 80 (9): 421-432, 2004.

    Issued and discussed a Grand Challenge problem to the simulation community to study the connection between different model abstractions through the human-computer interface. Resulted in 5 PhD dissertations and one UF Patent.

9. Minho Park and Paul A. Fishwick, Integrating Dynamic and Geometry Model Components through Ontology-based Inference, SCS Transactions on Modeling and Simulation, 81 (12): 795-813, 2005.

The first use of semantic web-based ontology construction as a method for integrative modeling: interconnecting geometric model components with dynamic model components in the human-computer interface.

10. Paul A. Fishwick, Ed., Aesthetic Computing, MIT Press, 2007.

Covers a new field where the role of design and the arts is applied to computing, rather the more common area of computer art. This text provides a bridge from the more formal aspects of system model design to the general public, thus providing a scholastic path of inquiry for modeling to achieve public relevance beyond technically oriented professional societies. Recent funded workshops in aesthetic computing were held at SIGGRAPH 2009 and in Charlotte, NC (March 2010), with Fishwick as an invited speaker.

## 11.    CREATIVE WORKS OR ACTIVITIES

**Computer Programs:**

SimPack Simulation Toolkit (1990-present): C++, Java and Python-based Toolkit for both discrete event and continuous simulation.

RUBE Simulation Environment in XML and X3D.

MOOSE Simulation Environment (1998-2000): C++, Tcl/Tk visual simulation environment multimodeling, fuzzy simulation and model abstraction.

ZAP Terminal Emulator, published by Solution Systems and the Programmer's Shop, Cambridge, Massachusetts (1984-2000). The program emulated the DEC VT102 and Tektronix 4014 terminals.

**Music and Art**

Second China Project with R. Tanay and J. Henderson (digital print 36"x12", posterboard), exhibited at Harn Engineering Nights, Samuel P. Harn Museum of Art, October 10, 2011.

Steampunk Obesity Machine with Z. Ezzell (digital print 36"x24", posterboard), exhibited at Harn Engineering Nights, Samuel P. Harn Museum of Art, October 10, 2011.

The Sky Oracle: Immersive Flowchart Representation for the Annexation of Tibet, exhibited at a juried exhibition of Information Aesthetics, SIGGRAPH 2009 Conference, August 2-7, 2009, New Orleans, Lousiana (Fishwick, Paul, Henderson, Julie, Fresh, Elinore, Kamhawi, Rasha, Coffey, Amy Jo, and Hamilton, Benjamin)

Created and juried an art show containing physical projects from the Aesthetic Computing class: 14 students exhibited at the WARPhaus Gallery, Gainesville, Florida, April 9th, 2007 7-9PM.

Featured Artist on Creative Lab's LavaMusic site (www.lavamusic.com) from November 5 through 12, 1999.

Cover illustration for the Society for Computer Simulation (SCS) journal Simulation, Volume 73, Number 1, July 1999.

Artwork (1 image) for the Independent Florida Alligator, Volume 92, Number 155, Thursday, June 10, 1999, page 3.

MP3.COM artist, with online Audio CD, since April 1999

"Koan Heads" (media: computer graphics print), Orlando Museum of Art: Art and Technology, 1997.

"Winged Thought" (media: pencil), Pennsylvania State University Art Museum, 1977.


## 12.      PATENTS AND COPYRIGHTS

Patent UF-13999, Portable Interactive Interface for Interview-Based Investigations, with Zach Ezzell.

Patent: UF-13997, Physiological Viewer and Simulator, with Zach Ezzell.

Patent: Mixed Simulator, patent UF-12687, A user-interface blending of an abstract model combined with the physical phenomenon, with John Quarles, Sem Lampotang, and Benjamin Lok.

Copyright: SimPack, 1990-present.

Trademark: RUBE, application for trademark in 1998, receipt in February 2002, University of Florida. Refers to the RUBE simulation environment.


## 13.      PUBLICATIONS (primary author names appear in order as listed)

### a.      Books, authored

1.   Fishwick, P. A. 2002. ``Dynamic Modeling'' (an electronic), Society for Modeling and Computer Simulation, Three CDs with 20 hours of multimedia on the subject of model structure and presentation for simulation. http://vimeo.com/metaphorz
2.   Fishwick, P. A. 1995. ``Simulation Model Design and Execution: Building Digital Worlds'', Prentice Hall, 450pp.

### b.      Books, coauthored: none

### c.      Books, edited:

1.   Fishwick, P. A. and B. Lok. 2007. Proceedings of the 3rd International North American Conference on Intelligent Games and Simulation (GAMEON 2007), Eurosis-ETI. 105pp, Sept. 10-12, 2007, Gainesville, Florida.
2.   Fishwick, P. A. 2007. ``Handbook of Dynamic System Modeling'' CRC Press, 800pp.
3.   Fishwick, P. A. 2006. ``Aesthetic Computing'' MIT Press, 457pp.

4.	Fishwick, P. A. and B. Lok. 2005. ``Proceedings of the 2005 Conference on Human-Computer Interface Advances for Modeling and Simulation (SIMCHI '05)'', Society for Computer Modeling and Simulation International, 84pp.

5.	Joines, J. A., R. R. Barton, K. Kang and P. Fishwick. 2000. ``2000 Winter Simulation Conference: The New Simulation Millennium'', 2109pp.

6.	Fishwick, P A., D. R.C. Hill and R. Smith. 1998. ``1998 Conference on Web-Based Modeling and Simulation'', Society for Computer Simulation International, Simulation Series, Volume 30, Number 1.

7.	Fishwick, P. A. 1994. ``Distributed Interactive Simulation Environments'', Proceedings of the Fifth Annual AI, Simulation and Planning in High Autonomy Systems Conference, IEEE Computer Society Press, 286pp.

8.	Fishwick, P. A.,  and P. A. Luker. 1991. (foreword: H. Simon), ``Qualitative Simulation Modeling and Analysis'', Springer Verlag, 330pp.

9.	Fishwick, P. A., and R. B. Modjeski. 1991. ``Knowledge Based Simulation: Methodology and Application'', Springer Verlag, 294pp.


**d.	Books, contributor of chapter(s)**

1.	Fishwick, P. A., Aesthetic Computing, 2012. Encyclopedia of Human-Computer Interaction, accepted for publication.

2.	Taylor, S. J. E., D. Bell, N. Mustafee, S. de Cesare, and P. A. Fishwick. 2010. Semantic Web Services for Simulation Component Reuse and Interoperability: An Ontology Approach. In Organizational Advancements through Enterprise Information Systems: Emerging Applications and Developments, ed, A. Gunasekaran and T. Shea. IGI Global, Inc., Chapter 21, 336-352.

3.	Fishwick, P. A. and H. Park. 2008. ``Queuing Modeling'',  Queue Modeling  and Simulation, Principles of Modeling and Simulation: A Multidisciplinary Approach, Sokolowski, J. A. and C. M. Banks, eds, John Wiley and Sons 2008, 71-90.

4.	Fishwick, P. A. and Y. A. Park. 2008. A 3D Environment for Exploring Algebraic Structure and Behavior, Chapter 30, Handbook of Research on Effective Gaming in Education, Ferdig, R., ed, Idea Group Incorporated (IGI), 546-559.

5.	Shim, H. and P. A. Fishwick. 2008. ``Visualization and Interaction Design for Ecosystems', In Encyclopedia of Ecology, Jorgensen, S. E., ed., Elsevier B. V., Amsterdam, The Netherlands, 3685-3693.

6.	Voinov, A. and P. A. Fishwick. 2007. ``Modules in Modeling'',  In Encyclopedia of Ecology, Jorgensen, S. E., ed., Elsevier B. V., Amsterdam, The Netherlands, 2419-2425.

7.	Shim, H. and P. A. Fishwick. 2007. ``Enabling the Concept of Hyperspace by Syntax/Semantics Co-Location within a localized 3D Visualization Space'', In Human-Computer Interaction in Cyberspace: Emerging Technologies and Applications'', Piazzalunga, Renata, ed., Idea Group Publishing, Hershey, PA.

8.	Fishwick, P. A. 2007. ``Customized Visual Computing: The Aesthetic Computing Method'' In Visual Languages for Interactive Computing: Definitions and Formalizations'' edited by Fernando Ferri, Idea Group, Inc.,  425-435.

9.	Fishwick, P. 2007. ``The Language of Dynamic System Modeling'', In Handbook on Dynamic System Modeling, Fishwick, Paul A., ed., CRC Press, ch. 1, 1-10.

10.	Park, M., P. A. Fishwick, and J. Lee. 2007. ``Multimodeling'', In Handbook on Dynamic System Modeling, Fishwick, P. A., ed., CRC Press, ch. 14, 1-27.

11.	Shim, H. and P. A. Fishwick. 2007. ``An Interactive 3D Approach to Integrating Model and Behavior in System Dynamics'', In Encyclopedia of Ecology, Jorgensen, Sven Erik, ed., Elsevier B. V., Amsterdam, The Netherlands.

12. Fishwick, P. A. 2006. ``An Introduction to Aesthetic Computing'', In Aesthetic Computing, Fishwick, Paul A., ed. MIT Press, pp. 3-27.
13. Hopkins, J. and P. A. Fishwick. 2001. ``The RUBE Framework for Personalized 3-D Software Visualization'' In Lecture Notes in Computer Science (LNCS) 2269, Stephan Diehl, ed., Springer Verlag, International Seminar, Dagstuhl, Germany, 368-380.
14. Cubert, R. and P. A. Fishwick. 2000. ``A Multimodeling Simulation Framework'' Chapter 28: Domain-Specific Application Frameworks: Frameworks Experience by Industry, John Wiley and Sons, M. E. Fayad and R. E. Johnson, eds, 591-613.
15. Fishwick, P. A. 1991. ``Invariance and Nominal Value Mapping as Key Themes for Qualitative Simulation''. In P. A. Fishwick and P. A. Luker, eds, ualitative Simulation Modeling and Analysis, Springer Verlag, 1-23.
16. Beck, H. and P. A. Fishwick. 1991. ``Natural Language, Cognitive Models and Simulation'', In P. A. Fishwick and P. A. Luker, eds, Qualitative Simulation Modeling and Analysis, Springer Verlag, 302-325.
17. Fishwick, P. A., 1990. ``Methods for Qualitative Modeling in Simulation'', In P. A. Fishwick and R. B. Modjeski, eds, Knowledge Based Simulation: Methodology and Application, Springer Verlag, 36-52.
18. Fishwick, P. A. 1989. ``Abstraction Level Traversal in Hierarchical Modeling'', In B. P. Zeigler, M. Elzas, and T. Oren, eds, Modelling and Simulation Methodology: Knowledge Systems' Paradigms, Elsevier North Holland, 393-429.
19. Fishwick, P. A. 1989. ``Process Abstraction in Simulation Modeling'', In Widman, L. E., D. H. Helman, and K. Loparo, eds, Artificial Intelligence, Simulation and Modeling, John Wiley and Sons, 93-131.


**e. Monographs: None**

**f. Refereed Publications**

**Journal Papers**

1. Srinivasan, R. S., Kibert, C., Fishwick, P. Ezzell, Z., Lakshmanan, J., and Thakur, S. Dynamic-BIM (D-BIM) Workbench for Integrated Performance Assessments of Building and Environment, submitted to *Building and Environment*, Elsevier, September 2012.
2. Kamhawi, R., Coffey, A.J., Fishwick, P., Henderson, J. (submitted). Causes and cognitive effects of Presence in virtual environments: The role of message- and user-related variables on presence and its impact on memory. Journal of Computer Mediated Communication. Submitted May 2012.
3. Rabelo, L., P. Fishwick, Z Ezzell, D. Miranda, N. Yousef, L. Lacy, and J. Sepulveda. 2012. Ontology-Centered Integration for Space Operations, Journal of Simulation, Palgrave McMillan. 2:1-13.
4. Mustafee, N., Katsaliaki, K., Fishwick, P. A., and Williams, M. D. 2012. SCS - 60 Years and Counting! A Time to Reflect on the Society's Scholarly Contribution to M&S From the Turn of the Millennium. *SCS Transactions on Modeling and Simulation*. January 2012. Published in preprint by SCS, 88(9):1047-1071.
5. Coffey, A.J., Kamhawi, R., Fishwick, P., and Henderson, J. (under review). Seeking Intercultural Sensitivity: A Comparative Examination on the Efficacy of Virtual vs. Web Environments, *International Journal of Human-Computer Studies*. February 2012.
6. Coffey, A.J., Kamhawi, R., Fishwick, P., and Henderson, J. (under review). Measuring Intercultural Sensitivity within Virtual and Web Environments: Dimensional Findings

using a Modified Chen and Starosta Intercultural Sensitivity Scale, *International Journal of Intercultural Relations*. December 2011.

7. Fishwick, P. A. Hypermodeling: An Integrated Approach to Dynamic System Modeling, Journal of Simulation, Palgrave MacMillan, 6: 2-8, 2012.

8. Rabelo, L., Marin, M., Fishwick, P. A., and Z. Ezzell. The Semantic Web and Space Operations. *SAE International Journal of Aerospace*. 4(2): 652-660. November 2011.

9. Beck, D., P. Fishwick, R. Kamhawi, A. Coffey, and J. Henderson, Synthesizing Presence: A Multidisciplinary Review of the Literature. Journal of Virtual Worlds Research. 3(3):3-35, May 2011.

10. Park, H. and P. Fishwick, An Analysis of Queuing Network Simulation Using GPU-Based Hardware Acceleration. ACM Transactions on Modeling and Computer Simulation (TOMACS), 21(3): 18-1 through 18-22.

11. Fishwick, P. 2012. A Decade of Digital Arts and Sciences at the University of Florida, Leonardo, MIT Press, 45(3):211-216.

12. Ezzell, Z., P. Fishwick, B. Lok, S. Lampotang, and A. Pitkin. 2011. An Ontology-Enabled User Interface for Simulation Model Construction and Visualization. Journal of Simulation, Palgrave MacMillan. 5(3): 147-156.

13. Quarles, J. S., S. Lampotang, I. Fischler, P. Fishwick, and B. Lok. 2010. Experiences in Mixed-Reality Co-Located After Action Review. 2010. Virtual Reality, Springer Verlag. 33(1):34-46.

14. Quarles, J., S. Lampotang, I. Fischler, P. Fishwick, and B. Lok. 2009. Scaffolded Learning with Mixed Reality", Computers and Graphic, Special issue on Virtual Reality, Springer Verlag, 33(1): 34-46.

15. Quarles, J., P. A. Fishwick, S. Lampotang, I. Fischler, and B. Lok. 2009. ``A Mixed Reality Approach for Interactively Blending Dynamic Model with Corresponding Physical Phenomena", ACM Transactions on Modeling and Computer Simulation, 20(4): 25 pages.

16. Park, H. and P. A. Fishwick. 2010. `` A GPU-Based Methodology and Library Supporting Fast Discrete-Event Simulation", SCS Transactions on Modeling and Simulation, 86(10): 613-628.

17. Bell, D., N. Mustafee, S. de Cesare, S. J. E. Taylor, M. Lycett and P. A. Fishwick. 2008. ``Ontology Engineering for Simulation Component Reuse" International Journal of Enterprise Information Systems, 4(4): 47-61, Idea Group Publishers.

18. Fishwick, Paul A. 2008. ``Software Aesthetics: from text and diagrams to interactive spaces. Int. J. of Arts and Technology, 1(1): 1-12.

19. Fishwick, P. A. 2006. ``Injecting Creativity into Teaching Simulation Modeling for Computer Science Students", SCS Transactions on Modeling and Simulation, 82(11): 719-729.

20. Corey, A. and P. A. Fishwick. 2007. ``An Approach to Improving Informal Mathematics Education through Aesthetic Computing and Dance-Based Representation", 9(2), Nov/Dec., JUR (Journal of Undergraduate Research), University of Florida.

21. Fishwick, P., S. Diehl, J. Prophet and J. Lowgren. 2005. ``Perspectives in Aesthetic Computing", Leonardo 38 (2): 133-141, MIT Press.

22. Fishwick, P. A. 2005. ``Enhancing Experiential and Subjective Qualities of Discrete Structure Representations with Aesthetic Computing", Journal of Visual Languages and Computing (JVLC), 16(5): 406-427.

23. Park, M. and P. A. Fishwick. 2005. ``Integrating Dynamic and Geometry Model Components through Ontology-Based Inference" Transactions of the Society for Modeling and Simulation International, December, 81(12): 795-813.

24.    Fishwick, P. A., T. Davis, and J. Douglas. 2005. ``An Empirical Study of Aesthetic Computing'', ACM Transactions on Modeling and Computer Simulation, July, 18(3): 254-279.

25.    Fishwick, P. A.. 2004. ``Toward an Integrative Multimodeling Interface: A Human-Computer Interface Approach to Interrelating Model Structures'', in the ``Grand Challenges'' special issue, SCS Transactions on Modeling and Simulation, September, 80 (9): 421-432.

26.    Shim, H. and P. A. Fishwick. 2004. ``RUBE2D: A Web-Based Customizable 2D Modeling and Simulation System'', International Journal of Simulation and Process Modeling (IJSPM), January, 1: 2-15.

27.    Fishwick, P. A. 2003. ``Nurturing Next-Generation Computer Scientists'', IEEE Computer, December, 106-108.

28.    Fishwick, P. 2003. ``Aesthetic Computing Manifesto'', Leonardo, MIT Press, 36 (4): 255-256.

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**Conference Papers (simulation conferences run at a 40% acceptance rate, and HCI/Virtual reality conferences are about 30%)**

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87  Fishwick, P. A. and N. I. Badler. 1985. ``Hierarchical Reasoning: Simulating Complex Processes over Multiple Levels of Abstraction'', In First Annual Workshop on Robotics and Expert Systems, June, NASA Johnson Space Center, Houston, TX,1:73-80.

88  Fishwick, P. A. and C. L. Blackburn. 1982. ``The Integration of Engineering Programs using a Relational Data Base Scheme'', In Second International Computer Engineering Conference (ASME), August, San Diego, CA. 1:173-181.

## g. Non-Refereed Publications

1.  Fishwick, P. A. 2005. ``The Many Faces of Models'', Asia Simulation Conference 2005 (ICSC 2005): Sixth International Conference on System Simulation and Scientific Computing, Beijing, China, October.

2.  Fishwick, P A. 2003. ``Art Software'', Rhizome Digest, October 3, 2003, http://www.rhizome.org

3.  Fishwick, P. A. 2001. ``EMERGEncy, ``Aesthetic Computing: Toward a Restructuring of Mathematics and Computer Science'', 2(10), http://www.creativedisturbance.com, November 14.

4.  Fishwick, P. A. 1999. ``Engineering Web-Based Digital Appliances'' In Appliance Manufacturer, July, 68, http://www.ammagazine.com.

5.  Fishwick, P. A. 1999. ``Discrete-Event Modeling and Simulation'' in the 1999 McGraw-Hill Encyclopedia of Science and Technology.

6.  Fishwick, P. A, E. L. Glisky, V. Gullapali, D. Herrmann, and M. G. Shafto, 1994. Modulated cognition. In V. L. Shalin, ed, Human performance in the complex workplace: Implications for basic research in Cognitive Science. Washington, DC: National Science Foundation.

7.  Fishwick, P. A. 1991. ``Incorporating Postscript Images in your LaTeX document'', UF Department of Computer and Information Science and Engineering Technical Report TR91-003. 8pp.

8.  Walczak, S. M. and P. A. Fishwick. 1988. ``A Centralized Methodology for Multi-Level Abstraction in Simulation'', Simulation Digest, 19(4): 5-9.

9.  Fishwick, P. A. and S. Feyock. 1984. ``PROFGEN: A Procedure for Generating Machine Independent High-Level Language Profilers'', ACM/SIGMETRICS Performance Evaluation Review}, 12(2): 27-31. Spring-Summer, pp. 27-31.

10. Badler, N. I., J. D. Korein, J. Gangel, and P A.. Fishwick. 1984. ``TEMPUS: Simulating Personnel and Tasks in a 3-D Environment'', Technical report, University of Pennsylvania, July, Progress Report 15, NASA Contract NAS9-16634, 50pp.

11. Fishwick, P. 1983. ``DBPQL: A View-Oriented Query Language for the Intel Data Base Processor'', Technical Report 172191, NASA Contractor Report, July, Contract NAS1-16000, 70pp.

12. Fishwick, P., T. Sutter, and C. L. Blackburn. 1983. ``Prototype Integrated Design (PRIDE) System: Reference Manual, Volume 2: Schema Definition'', Technical Report 172183, NASA Contractor Report, July, Contract NAS1-16000, 65pp.
13. Fishwick, P. A. 1983. ``SPP: A Data Base Processor Data Communications Protocol'', Technical Report 172144, NASA Contractor Report, May, Contract NAS1-16000, 120pp.
14. Fishwick, P. A. 1983. "DBPSSP: A Data Base Processor Semantics Specification Package", Technical Report 172172, NASA Contractor Report, June, Contract NAS1-16000, 80pp.

## 14 LECTURES, SPEECHES OR POSTERS PRESENTED AT PROFESSIONAL CONFERENCES/MEETINGS

### International

#### Keynotes and Plenary Addresses:

"Building Digital Worlds: Explorations in Modeling and Simulation", 1st Congresso Internacional de Innovacion Technologica, University of Chiapas, Tuxtla Gutierrez, Mexico, November 8, 2012.

"The Model with a Thousand Faces", 2009 Winter Simulation Conference, WSC 2009 Titans of Simulation Talk (one of two), December 13-16, 2009. Austin, Texas.

``The Role of Embodiment in Simulation Model Visualization and Experience'', CNRS Conference: Simulation Scientifique et materialisation artistique: une exploration transdisciplinaire arts/sciences'', Jaunary 8-9, 2008, Paris, France.

``The Languages of Modeling for Simulation and Optimization'' 11th AAIA/ISSMO Conference on Multidisciplinary Analysis and Optimization, September 8, 2006, Portsmouth, Virginia.

``The Many Faces of Models'', Asia Simulation Conference 2005 (ICSC 2005): Sixth International Conference on System Simulation and Scientific Computing, Beijing, China, October 25, 2005.

``What Games Teach Us about Modeling'' 2004 Summer Simulation Multiconference, July 27, 2004, San Jose, California.

``Modelling: Taking it to the Next Level'', 2004 U.K. Operations Research Society Simulation Workshop, March 2004, Birmingham, England.

36th Annual Simulation Symposium, March 31, 2003, Orlando, Florida.

``3D Graphics for Behavioral Simulation Models'', (WEBSIM '00)   3rd Annual Conference on Web Based Modeling and Simulation, part of the 2000 SCS Western Multiconference, San Diego, CA, January 23, 2000.

``On Web-Based Modeling and Simulation'', SPIE AeroSense Conference, Enabling Technology for Simulation Science, April 18, 2001, Orlando, Florida.

``The Future of Modeling in Space Science Simulation'' given at the Workshop on ``The Roles of Computer Simulation'' in recognition of the CESDIS 10th Anniversary, January 20, 1999, NASA Goddard Space Flight Center.

``The Art of Modeling'', (WEBSIM '99) 2nd Annual Conference on Web Based Modeling and Simulation, part of the 1999 SCS Western Multiconference, San Francisco, CA, January 18, 1999.

``Reorganizing Model Design for a Unified Simulation Discipline'', 28th Annual Simulation Symposium, Society for Computer Simulation Multiconference, Phoenix, Arizona, April 9-13, 1995.

``Qualitative Physics: Toward the Automation of Systems Problem Solving'', AI, Simulation and Planning in High Autonomy Systems, Tucson, AZ. March 1990, (85 participants).

``Computer Simulation: Growth Through Extension'' European Simulation Multiconference, Barcelona, Spain, June 1-3, (240 participants), June 1-3, 1994.

``Key Research Directions in Behavioral Representation for Computer Generated Forces,'' Second Behavioral Representation and Computer Generated Forces Symposium sponsored by U.S. Army PMTRADE and DARPA. Orlando, FL. May 6-7, 1991, 110 participants).


**Conference Talks:**

Talks were given <u>for each conference paper</u> listed in Section 16(f)

**Selected Invited Talks:**


"Building Digital Worlds: Explorations in Computer Modeling & Simulation", Invited Talk:

     University of Texas at Dallas, March 21-23, Dallas, Texas.

     University of Georgia, March 5-6, Athens, Georgia.

     University of Mississippi, April 2011, Oxford, Mississippi.

     Michigan Technological University (MTU), February 13-15, 2011, Houghton, Michigan.

     South Dakota State University, December 1-2, 2010, Brookings, South Dakota


"Aesthetic Computing: Extracting Compelling Interaction from Information", Florida Institute for Human & Machine Cognition (IHMC), January 20, 2011, Ocala, Florida.

"Putting a Face on How Things Work" given at the following:

    Brunel University, Uxbridge, United Kingdom, November 20, 2007, Computer Science Department

    University of Warwick, Warwick, United Kingdom, November 30, 2007, Warwick Business School.

    University of Lancaster, Lancaster, United Kingdom, December 4, 2007, Lancaster Business School.

    Goldsmiths College, London, United Kingdom, December 6, 2007, Computer Science Department.

Model System Modeling: Blending Language and Human Interaction" given at the Old Dominion University, Computer Science Colloquium Series, March 1, 2007.

``3D Software Visualization'' given at the 2001 Dagstuhl Workshop on ``Software Visualization'', May 2001, Dagstuhl, Germany.

"Multimodeling Design" given at the 1999 Dagstuhl Workshop on ``Agent-Based Modeling and Simulation'', July 1999, Dagstuhl, Germany.

**15.**     **CONTRACTS AND GRANTS SINCE LAST PROMOTION (NOT TO EXCEED TEN YEARS) OR DURING THE LAST FIVE YEARS FOR TENURE NOMINEES, whichever is more recent.**

**Current Status of Grants and Proposals as of April 2011:**

(1) Proposal invited based on submitted preproposal, Airforce Office of Scientific Research (AFOSR) "An Integrated Semantic Web Approach to Linking Software Design with Cyberinfrastructure". Amount: $190K. Full proposal to be submitted by end of 2011 with potential for funding in FY12.

(2) Proposals Submitted (status unknown): 3 National Science Foundation K-12 Discovery Research proposals.

## a. Funded Externally (last 10 years)

| Title of Grant | Funding Agency | PI/CoPI | Effective Dates | | Value of Contract/Grant | Nominee's Funding Portion |
|---|---|---|---|---|---|---|
| | | | Start Date | End Date | | |
| A Dynamic (D-BIM) Workbench for Low-Net Zero Energy Buildings | University of Florida Opportunity Fund | Co-PI | 5/1/2012 | 4/30/2013 | $87,165 | |
| Using Social Network Analysis to Guide Interview Structure during Tuberculosis-Related Contact Investigations | National Institutes of Health (NIH) | PI | 4/2011 | 3/2013 | $382K | $212K |
| A Model Immersive Cultural Learning Environment | U.S. Army | PI | 9/2007 | 4/2010 | $1.2M | $600K |
| A Comparative Analysis of Fire Intensity between Circular and Elliptical Shaped Airframes using NFPA 403 Agent Application Rates and Quantities | U.S. Air Force | Co-PI | 5/2008 | 12/2008 | $125K | $56K |
| Dynamic Mission Tasking for Mixed Human and Unmanned System Teams | U.S. Army | PI | 8/2006 | 8/2007 | $96,857 | $96,857 |
| A Framework and Taxonomy for the Simulation of Spaceport Launch Operations | UCF/UF Space Research Institute | PI | 7/2006 | 6/2007 | $250K | $125K |
| An Investigation into Aesthetic Computing within the Digital Arts and Sciences Curricula | NSF | PI | 9/2001 | 9/2005 | $436K | $295K |
| Aesthetic Computing in Mathematics | NSF - RET | PI | 9/2005 | 8/2006 | $19,000 | $0 |
| An XML-Based Software Architecture enabling Model Fusion for the Battle Infosphere | U.S. Air Force | PI | 9/2001 | 4/2005 | $288,500 | $200K |
| Model Component Integration and Development of a Graphical Interface for the Across Trophic Level System Simulation (ATLSS) | U.S. Dept of Interior | Co-PI | 1/1999 | 8/2000 | $600K | $190K |

**Summary of External Grant Funding Received, Year - present**

**SUMMARY OF GRANT FUNDING**

|  ROLE | TOTAL |
|---|---|
| **Principal Investigator** | **$2,340,357** |
| **Co-Principal Investigator** | **$725,000** |
| **Totals** | **$3,065,357** |

**b. Funded Internally**

| Title of Grant | Funding Agency | PI/CoPI | Effective Dates | | Value of Contract/Grant | Nominee's Funding Portion |
|---|---|---|---|---|---|---|
| | | | Start Date | End Date | | |
| Simulation Faculty Learning Community | UF | Co-PI | 5/2008 | 12/2008 | $6,600 | $0 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Summary of Internal Grant Funding Received, Year - present**

**SUMMARY OF GRANT FUNDING**

| ROLE | TOTAL |
|---|---|
| **Principal Investigator** | **$0** |
| **Co-Principal Investigator** | **$6,600** |

**Totals**       **$6,600**

## 16. UNIVERSITY GOVERNANCE

General: The most significant impact roles played are as (1) Co-Editor (with R. Newman) of what is the current CISE graduate program based on core computer science areas in 1987, (2) Director of the Digital Arts and Sciences programs an curriculum (2000-), and (3) Initiator of the Department's Industrial Advisory Board in 1996.

2010-2011: Chair, College Sabbatical and FEO Committee, Digital Worlds Institute Curriculum Committee, College Review Committee for Opportunity Fund proposals, Chair Digital Arts and Sciences (DAS) Departmental Committee, Digital Arts and Sciences Director, Member Department Graduate Admissions Committee and Tenure and Promotion Committee

2009-2010: Chair, College Sabbatical and FEO Committee, College Review Committee for Opportunity Fund proposals, Chair Digital Arts and Sciences (DAS) Departmental Committee, Digital Arts and Sciences Director, Member Department Graduate Admissions Committee and Tenure and Promotion Committee

2007-2009: Member Department Graduate Admissions Committee, Department Curriculum Committee, Chair Digital Arts and Science (DAS) Department Committee, Digital Arts and Sciences Program Director.

2006: Member Department Graduate Admissions Committee, Department Curriculum Committee, Chair Digital Arts and Science (DAS) Department Committee, Digital Arts and Sciences Program Director, Department Steering Committee, Publicity Director

2005: Member Department Graduate Admissions Committee, Department Curriculum Committee, Chair Digital Arts and Science (DAS) Department Committee, Digital Arts and Sciences Program Director,  Department Steering Committee, Publicity Director

2004: Member Department Graduate Admissions Committee, Department Curriculum Committee, Chair Digital Arts and Science (DAS) Department Committee, DAS Graduate Department Advisor, Department Steering Committee

2003: Member Department Graduate Admissions Committee, Department Curriculum Committee, Chair Digital Arts and Science (DAS) Department Committee, DAS Graduate Department Advisor

2002: UF Faculty Senate, Member College Tenure and Promotion Board, Department Faculty Recruiting Committee (member), Member Department Curriculum Committee, Chair Digital Arts and Science (DAS) Department Committee, DAS Department  Graduate Advisor, DAS Admissions Committee

2001: UF Faculty Senate, Member College Tenure and Promotion Board, Chair Department Faculty Recruiting Committee, Member Department Curriculum Committee, Chair Digital Arts and Science (DAS) Department Committee, DAS Department Graduate Advisor, DAS Admissions Committee

2000: Industrial Advisory Board (Chair), Curriculum Committee Member.

1999: Facilities Committee; Industrial Advisory Board (chair); Digital Arts and Sciences (DAS) Program Committee (chair).

1998: Facilities Commmittee; Industrial Advisory Board (chair)

1997: Facilities Committee; Facilities Violations and Appeals Committee; Industrial Advisory Board Committee (Chair); Electronic Theses and Dissertations Committee.

1996: Curriculum Committee; Industrial Liasson Committee (Chair); Facilities Committee; Teaching Award Committee; Facilities Violations and Appeals Committee; Industrial Advisory Board Committee (Chair).

1995: College International Programs Committee; Industrial Liasson Committee (Chair).

1994: Curriculum Committee.

1993: Graduate Studies Committee; Colloqium Committee (Chair).

1992: Graduate Studies Committee; Graduate Coordinator; Department Planning Committee ; Curriculum Committee (Chair); Colloqium Committee (Chair).

1991: Graduate Studies Committee; Graduate Coordinator; Department Planning Committee; Curriculum Committee (Chair).

1990: Graduate Studies Committee; Graduate Coordinator; Department Planning Committee; Curriculum Committee (Chair).

1989: Faculty Search & Screening Committee; Graduate Studies Committee.

1988: Curriculum Committee; Commencement Marshall; Faculty Search & Screening Committee; Graduate Studies Committee.

1987: Curriculum Committee; Commencement Marshall; Faculty Search & Screening Committee.

1986: Curriculum Committee; Commencement Marshall.

## 17.     CONSULTATIONS OUTSIDE THE UNIVERSITY

(2012-): Expert witness, patent litigation.

(2006-): 3D computer animation reconstruction and simulation

(1995-): State of Florida auditor of hurricane catastrophe models used by insurers to plan rate filings with the Office of Insurance Regulation. This auditing position is for software engineering and has resulted in significant understanding of how industry constructs and maintains large simulation software, specifically for risk modeling. The experience has also led to the creation of a robust set of computer software standards that are used to verify large simulation software platforms.

## 18.     EDITOR OF A SCHOLARLY JOURNAL, SERVICE ON AN EDITORIAL

# ADVISORY BOARD OR REVIEWER FOR A SCHOLARLY JOURNAL

ACM SIGSIM Advisory Board member, Appointed January 2009.

Editorial Board of International Journal of Visual Languages and Computing (JVLC), Elsevier North Holland (appointed May 2007)

Editorial Board of International Journal of Arts and Technology (IJART), InderScience Publishers (appointed June 2007).

Editorial Board of Mathematical Modelling and Applied Computing (MMAC), http://www.ripublication.com/mmac.htm,(appointed June 2006).

Associate Editor of Journal of Simulation (JOS), UK Operational Research Society and Palgrave (appointed June 2005).

Associate Editor of International Journal of Simulation and Process Modeling (IJSPM), Interscience Publishers (appointed January 2004).

Edited a quarterly column the ``Art of Modeling'' (10 articles from 2002-2004 in the Society for Computer Simulation ``Modeling and Simulation'' magazine.

Associate Editor of the  International Journal of General Systems}, edited by George Klir, Gordon Breach Publishers (appointed March 2000).

Area Editor of the  ACM Transactions on Modeling and Computer Simulation, (1990-).

Member of the Editorial Board of the International Journal of Computer Simulation, Ablex Publishing Co (appointed April 1990).

Member of the Editorial Board of  The Journal of Systems Engineering, Springer Verlag International (appointed August 1990).

Editorial Advisory Board Member for the Transactions of the Society for Computer Simulation, (Since 2000).

Associate Editor of the  Transactions of the Society for Computer Simulation  (1989-2000).

Associate Editor of the IEEE Transactions on Systems, Man and Cybernetics, (January 1992-January 2000).

Associate Editor of the INFORMS Journal on Computing in the area of modeling (1997-2007).

Associate Editor of the International Journal of Computational Science (1997-2007). This journal is represents a shift from the existing journal Future Generation Computer Systems (FGCS), published by Elsevier North-Holland.

Creator and Moderator of a world-wide electronic digest devoted to topics in computer simulation (COMP.SIMULATION). Created in December 1987 (Moderated until November 1993).

Edited a monthly column in the journal Simulation called ``Simulation Network News'' for 1991.

Associate Editor of the joint IEEE-CS, ACM quarterly publication SIMULATION DIGEST (appointed December 1987).


## 19.  INTERNATIONAL ACTIVITIES


Visiting Research Professor, Brunel University, Brunel University, London, United Kingdom, October 1 through December 15, 2007. Significance: Collaboration on ontologies and semantic web applications in operations research for joint publications and US-UK workshop creation every two years.

Visiting Scientist, US Air Force Research Laboratory, Rome, New York, July 11-15, 2006 Significance: To collaborate with Air Force scientists in modeling and simulation research.

Distinguished Visiting Scientist, June 1-6, 2005, Old Dominion University and Virginia:Modeling and Simulation Center (VMASC), Norfolk, Virginia. Significance: To work with ODU and VMASC staff to collaborate on future research objectives in the areas of modeling and simulation.

Visiting Scientist, Jet Propulsion Laboratory, California Institute of Technology, May 30, 1998 through June 20, 1998. Significance: To study two major modeling efforts at JPL (Develop New Products (DNP) and Intelligent Synthesis Environments (ISE)) and propose a roadmap for modeling improvements.

Visiting Scientist, Institute for Computer Applications in Science and Engineering (ICASE), July 11, 1994 through July 15,1994, Hampton, VA (at NASA Langley Research Center). Significance: To work closely with NASA personnel on modeling problems. To interact with other investigators.

Navy-ASEE Summer Faculty Research Associate, June 7, 1994 through August 19, 1994, Naval Air Warfare Center Training Systems Division, Orlando, Florida. Significance: To integrate with training personnel for simulation research.

Visiting Professor, June 11, 1993 through June 25, 1993 at the University of Lund, Sweden, Department of Automatic Control. Significance: To integrate with  personnel regarding hybrid modeling and simulation techniques.

**Conference Chair Roles**

2007 International Workshop on Visual Languages and Computing (Co-Program Chair with Kang Zhang, University of Texas at Dallas), San Francisco, Sept. 6-8, 2007.

2007 GAMEON-NA 2007 (Co-Chair with Benjamin Lok), Gainesville, Florida, Sept 10-12, 2007.

2005 Human-Computer Interface Advances for Modeling and Simulation SIMCHI '05 (General Chair), Part of the 2005 Western Simulation Multiconference, New Orleans, January 23-25, 2005.

2002 Aesthetic Computing (Co-Chair with Roger Malina and Christa Sommerer). Dagstuhl, Germany. July 15-19, 2002. (46 confirmed participants).

2000 Winter Simulation Conference (General Chair), December 10-13, 2000. Nominated and elected by the WSC board in May 1996. The Winter Simulation Conference is the world's largest simulation conference, and has been held annually in December since 1967, 860 registered.

Agent-Oriented Software Approaches in Distributed Modeling and Simulation: Challenges and Methodologies (Co-Chair with Adelinde Uhrmacher, University of Ulm, Germany and Bernard Zeigler, University of Arizona). Dagstuhl, Germany. July 20-24, 1999 (40 participants)

Web-Based Modeling and Simulation (General Co-Chair with David Hill, Blaise Pascal University, France), San Diego, CA., January 10-12, 1998 (100 participants).

Fifth Annual AI, Simulation and Planning in
High Autonomy Systems Conference (Conference Chair), Gainesville, FL.
December 7-9, 1994 (78 participants).

Second Annual AI, Simulation and Planning in High Autonomy Systems Conference (Conference Co-Chair with Bernard Zeigler and Jerzy Rozenblit, University of Arizona), Conference Theme: ``Integrating Qualitative and Quantitative Knowledge for Complex System and Simulation Models.'' Cocoa Beach,FL, April 1991 (85 participants).

Third AI and Simulation Workshop at AAAI 88 (Conference Chair), Minneapolis, MN, August, 1988 (50 participants).

**International Conference Program Committees**

SIMLTECH 2013, 3$^{rd}$ International Conference on Simulation and Modeling Methodologies and Applications, July 29-31 2013, Reykjavik, Iceland.

ACM Creativity and Cognition 2013 Conference, June 17-20, 2013, Sydney Australia.

Symposium on Theory of Modeling and Simulation (TMS 2013), April 7-10, Bahia Restor, San Diego, CA.

3$^{rd}$ International Workshop on Model-Driven Approaches for Simulation Engineering (Mod4Sim '13), part of the SCS 2013 SpringSim Conference, San Diego, CA. April 7-10 2013.

Steering Committee Member, ACM SIGSIM PADS, 2012-2013.

VINCI 2012: International Symposium on Visual Information Communication and Interaction, Hangzhou, China, September 27-28.

SIMUL 2012, Fourth International Conference on Advances in Systems Simulation, Lisbon, Portugal, November 18-23, 2012.

SIMULTECH, 2nd International Conference on Simulation, Rome, Italy, July 28-31, 2012.

IASTED International Conference on Modeling, Identification, and Control (AsiaMIC 2012),

Phuket, Thailand, April 2-4, 2012.

2nd International Workshop on Model-driven Approaches to Simulation Engineering (Mod4Sim '12), SCS SpringSim 2012 Conference, March 26-29, Orlando, Florida 2012.

Operations Research Society Simulation Workshop 2012 (SW12), March 27-28, Worcestershire, England.

ACM SIGGRAPH International Conference on Virtual Reality Continuum and its Applications (VRCAI), December 11-12, 2011, Hong Kong.

IASTED International Conference on Modelling, Simulation, and Identification (MSI 2011), November 7-9, 2011, Pittsburgh, PA.

Web3D 2011 Conference, June 20-22, 2011, Paris, France.

8th ACM Conference on Creativity and Cognition, November 3-6, 2011, Atlanta, GA.

10th IEEE/ACIS International Conference on Computer and Information Science (CIS 2011) May 16-18, 2011, Sanya, Hainan Island, China.

Third International Conference on Advances in Systems Simulation (SIMUL 2011), October 23-28, 2011, Barcelona, Spain.

First International Workshop on Model-driven Approaches for Simulation Engineering (Mod4Sim), Part of the SCS SpringSim Conference, April 4-9, Boston, MA.

IASTED International Conference on Modelling, Identification, and Control (MIC 2011), Feb 4-16, Innsbruck, Austria.

Web3D 2010 Conference, July 24-25, 2010, Los Angeles, CA.

30th IASTED International Conference on Modeling, Identification, and Control (AsiaMIC 2010), Nov. 24-26, 2010. Bangkok, Thailand.

2010 Artificial Intelligence for Simulation Workshop at the 19th European Conference on Artificial Intelligence (ECAI 2010), August 16-20, Lisbon, Portugal.

2010 Agent Directed Simulation Symposium, (ADS '10), Part of the 2010 Spring Simulation Simulation Multiconference (SpringSim '10), April 12-14, 2010, Orlando, Florida.

Second International Conference on Advances in System Simulation (SIMUL 2010), August 22-27, 2010, Nice France.

Tenth International Conference on Intelligent Tutoring Systems: Bridges to Learning (ITS 2010), 3rd Workshop on Culturally Aware Tutoring (CATS 2010), June 14-16, 2010, Pittsburgh, PA.

2010 International Workshop on Visual Languages and Computing (VLC 2010), part of the 16th International Conference on Distributed Multimedia Systems (DMS '10), October 14-16, 2010, Oak Brook, Illinois.

2010 U.K. Operations Research Society Simulation Workshop (SW10), March 23-24, Worcestershire, England.

2009 Visual Information Communications International, Sept. 24-25, 2009, University of Technology, Sydney, Australia.

ArtsIT 2009 International Conference on Arts \& Technology, September 24-25, 2009, Yi-Lan, Taiwan.

First International Conference on Advances in System Simulation (SIMUL 2009), September 20-25, 2009, Porto, Portugal.

International Conference on Distributed Multimedia Systems, Redwood City, San Francisco Bay, September 10-12, 2008 (International Workshop on Visual Languages and Computing).

Agent-Directed Simulation Symposium (ADS '09), Sponsored by the Society for Modeling and Simulation International, March 22-27, San Diego, CA, 2009.

GAMEON-NA 2008, August 13-15, 2008, McGill University, Montreal, Canada.

Web3D 2008 Symposium, colocated with SIGGRAPH 2008, August 9,10 2008.

Asia Simulation Conference 2007 (AsiaSim2007),  published as Springer Lecture Notess in Computer Science,  Seoul, South Korea, September 2007.

IASTED International Conference on Modelling and Simulation (AsiaMS 2007), Beijing, China, October 8-10, 2007.

 IASTED International Conference on Applied Simulation and Modelling, Palma De Mallorca, Spain, August 29-31, 2007.

IEEE Symposium Series on Computational Intelligence,  Honolulu, Hawaii, April 1-5, 2007.

Biotechnology and Bioinformatics Symposium (BIOT-2006), Provo, Utah, October 20-21, 2006.

IASTED International Conference on Applied Simulation and Modelling (ASM 2006), Rhodes, Greece, June 26-28, 2006.

IASTED International Conference on Applied Simulation and Modelling (ASM 2005), Benalmadena, Spain, June 15-17, 2005.

Agent-Directed Simulation Symposium, within 2005 SCS Advanced Simulation Technologies Conference,  San Diego, CA, April 2-8, 2005.

International Conference on Modeling & Simulation, Blaise Pascal University, France, June 12-15, 2005.

Second Biotechnology and Bioinformatics Symposium: A Community and Academic Forum (BIOT-05), Colorado Springs, CO, August 15, 2005.

First Biotechnology and Bioinformatics Symposium: A Community and Academic Forum

(BIOT-04), Colorado Springs, CO, Sept. 24, 2004.

ELSSC 2004. First Environmental and Life Science Simulation Conference, Part of the International Mediterranean Modeling Multiconference, Genoa, Italy, October 28-31, 2004.

13th Conference on AI, Simulation and Planning in High Autonomy Systems, Jeju, South Korea, Oct. 4-6, 2004.

PADS 2003, the 17th ACM/IEEE/SCS Workshop on Parallel and Distributed Simulation, San Diego, CA, June 2003.

Second International Conference on Visual Representations and Interpretations, Liverpool, September 9-12, 2002.

Third Conference on Simulation Methods and Applications (CSMA 2002), Orlando, Oct. 28-29, 2002.

1998-2004 SPIE Conference on Enabling Technology for Simulation Science, held annually in April of each year.

First International Conference on Grand Challenges for Modeling and Simulation (part of Society for Computer Simulation Western MultiConference, January 2002 in San Antonio).

PADS 2002, the 16th ACM/IEEE/SCS Workshop on Parallel and Distributed Simulation, Washington (D.C., USA), May 12-15, 2002.

IEEE (VR2002) IEEE Virtual Reality Conference, Orlando, Fl. March 24-28, 2002.

33rd Annual Simulation Symposium, Washington, D.C., April 16-20, 2000.

1999 Web-Based Modeling and Simulation Conference, Part of the 1999 Western Simulation Multiconference, San Francisco, CA, January 18-21, 1999.

1999 European Simulation Multiconference, Warsaw, Poland (ESM '99), June 1-4, 1999.

1997 IEEE International Conference on Systems, Man and Cybernetics, October 12-15, 1997, Hyatt Orlando, Orlando, FL

First World Congress on System Simulation, September 1-4, 1997, Singapore.

30th Annual Simulation Symposium, Atlanta, Georgia, April 7-9, 1997.

First Workshop on Simulation and Interaction in Virtual Environments, July 13-15, 1995, Iowa City, Iowa.

28th Annual Simulation Symposium, Phoenix, Arizona, April 9-13, 1995

EUROSIM Simulation Congress, September 11-15, 1995, Technical University of Vienna, Vienna, Austria.

PDCS '95: Eighth International Parallel and Distributed Computing Systems, September 20-23,

Orlando, Florida.

1993,1994,1995 International Workshop on Modeling, Analysis and Simulation of Computer Telecommunication Systems (MASCOTS). Locations: San Diego, CA: 1993, Durham, NC: 1994,1995.

Fourth International Workshop on Computer Aided Systems Technology, University of Ottawa, Ottawa, CA, May 16-20, 1994.

International Symposium on Integrating Knowledge and Neural Heuristics, Pensacola FL, May 9-10, 1994.

ESS'94: 1994 European Simulation Symposium, Istanbul, Turkey.

International Workshop on Simulation in Manufacturing Systems, Asian Institute of Technology, Bangkok, Thailand, Nov. 9-11, 1994.

Third and Fourth Annual AI, Simulation and Planning in High Autonomy Systems Conference, Perth Australia. June 1992; Tucson, AZ, September 1993.

1993 OOPSLA Conference, Washington, DC, October

Coordinator for the second, fourth and fifth AI and Simulation Workshop
at AAAI 87 (Seattle), IJCAI 89 (Detroit), AAAI 90 (Boston), August, 1987
(50 participants).

1992,1993 Applications of Artificial Intelligence X and XI, SPIE. Locations: Orlando, FL.

Steering Committee member for the Workshop on Parallel and Distributed Simulation (PADS), Anaheim, CA. Jan. 21, 1991.


**20.** **SERVICE TO SCHOOLS -**The 1984 Legislature determined that service to the public schools (K-12) would be considered for tenure and/or promotion purposes. Such service should be listed in this area.

Obtained two NSF Research Experiences for Teachers (RET) grants for two high school teachers of mathematics in connection with the NSF-sponsored grant on Aesthetic Computing, 2005-2006.

Served as Science Fair judge for Lincoln Middle School, Gainesville, Florida, Fall 2001.

Served as Science Fair judge for Lincoln Middle School, Gainesville, Florida, Fall 2000.

Talk on ``Boomerangs.'' Brentwood School, Gainesville, Florida, Second Grade. Spring 1995.

Talk on ``Chess.'' Brentwood School, Gainesville, Florida, First Grade. Fall 1994.

**21.** **MEMBERSHIP AND ACTIVITIES IN THE PROFESSION**

Chair, ACM SIGSIM (Special Interest Group in Simulation), July 1, 2012-June 30, 2014.

Society for Computer Modeling and Simulation (SCS), Fellow

IEEE, Senior Member

ACM, Member

Chair, IEEE-CS Technical Committee on Simulation (TCSIM). Term: June 1988-June 1990.

## 22.    HONORS .

2011 NASA Certificate of Appreciation for Annual Proposal Reviewing, July 2011.

Best Paper Award for Conference division paper,  Coffey et al. 2010.

Florida Blue Key Society Distinguished Professor (one of four in the University), October 2008.

SCS Distinguished Lectureship Program (one of seven), April 2006

KidSim (in conjunction with WSC 2000) Sponsorship Certificate of Appreciation, March 2001.

Association for Computing Machinery Recognition of Service Award In Appreciation for Contributions to ACM, General Chair WSC '00, December 10-13, 2000.

WSC Distinguished Service Award, December 2000, ``For service as General Chair, Winter Simulation Conference 2000, Orlando, Florida"

SCS Outstanding Service Award, December 2000, ``For outstanding leadership effort in several conference organizations including the 2000 Winter Simulation Conference and the WEBSIM conference series"

Elected to Fellow of the Society for Computer Simulation (SCS) February, 1998.

ACM SIGSIM Distinguished Lecturer (one of four), December 1998, Multimedia Presentation:

Received a IEEE Certificate of Recognition for an invited three-hour tutorial presented at the 1997 IEEE International Conference on Systems, Man and Cybernetics: Computational Cybernetics and Simulation, Orlando 12-15, 1997.

Received a Office of Naval Research Certificate of Recognition for Research Contributions made through the 1994 NAVY-ASEE Summer Faculty Research Program, June-August 1994.

CIS Department Teacher of the Year Award, 1991.

Awarded Senior Membership in the Institute for Electrical and Electronics Engineers (IEEE) and in the Society for Computer Simulation (SCS), 1991.

IEEE Computer Society Certificate of Appreciation for Leadership of the Simulation Committee (TCSIM). Two Year Term: June 1988-June 1990.

Received a National Science Foundation Engineering Research Initiation Award, 1989.

Received a NASA Certificate of Recognition for data base machine research, 1983.