

MARIA C.R. HARRINGTON

CONTACT INFORMATION

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Web: <http://www.sis.pitt.edu/~mariah/phd/index.html>

Video: <http://www.myvirtualfieldtrips.com/>

EDUCATION

PhD. Information Science, 2008

Information Sciences and Technology Program, School of Information Sciences,
UNIVERSITY OF PITTSBURGH, Pittsburgh, PA.

Dissertation Title:

“Simulated Ecological Environments for Education (SEEE): A Tripartite Model Framework of HCI Design Parameters for Situational Learning in Virtual Environments.”

Committee Members:

- **Dr. Peter Brusilovsky (Chair), Associate Professor, Information Sciences**
- Dr. Marek J. Druzdzel, Associate Professor, Information Sciences
- Dr. Toni Carbo, Professor, Information Sciences
- Dr. Tony Debons, Professor, Information Sciences
- Dr. Susan Kalisz, Professor, Department of Biological Sciences
- Dr. Kevin Crowley, Associate Professor, School of Education

Specialization:

- Virtual Reality and Environments used as Educational Simulations (Field Trips)
- Virtual Environments for Informal Learning and the 3D Web
- Video Games and Internet Metaverses used for Knowledge Acquisition
- Human Computer Interaction and Human Factors in System Design for the Child
- Video Games and Internet Metaverses used for Computer Graphics and Art

Master of Science (MS) in Information Science, 1990

Information Sciences and Telecommunications Program, School of Information Sciences,
UNIVERSITY OF PITTSBURGH, Pittsburgh, PA.

Specialization:

- Graphical User Interface Design and Development
- Data visualization
- Data exploration
- Image databases
- Multi-media applications

Bachelor of Science (BS) in Economics, 1988

CARNEGIE MELLON UNIVERSITY, Pittsburgh, PA.

- **Economics Major:** Focused on macroeconomics computer modeling systems.
- **Art Minor:** Art studies concentrated on computer 2D and 3D systems application to "electronic paintings." <http://www.mariacrharrington.org/>

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GRANTS & AWARDS

Celebration of Innovation, 2006:

University of Pittsburgh, Office of the Provost and the Office of Technology Management. An event recognizing innovated and creative individuals whose research is resulting in intellectual property for licensing and start-ups.

NSF Travel Grant Award 2006:

Travel grant to ACM Designing Interactive Systems (DIS) Conference, Pennsylvania State College, State College, PA.

The 30th Annual Honors Convocation 2006:

University of Pittsburgh. Honored as one of the outstanding students of the university.

ESRI GIS Mapping and Software Travel Grant Award 2005:

Travel grant to the Conference on Spatial Information Theory (COSIT).

Allen Kent Award. School of Information Sciences. University of Pittsburgh. 2005:

Annual award presented to a graduate student who makes an outstanding contribution to the program.

Teaching Fellow, School of Information Sciences. University of Pittsburgh. 2003-8:

A competitive and full scholarship with stipend for PhD research and study and teaching responsibilities.

Planning and Innovation Grant, Holyoke Community College, Holyoke, MA. 1997.

Develop a web-based framework for online, multimedia, course material for the delivery of curriculum. Solution generalized and shared with other faculty in the college.

IBM Grant for Education and Innovation Award, Rotman School, MBA Program, University of Toronto, 1991-1992.

Developed system that allowed for custom video-clip editing and augmentation used to enhance student learning in conflict management, meeting management, leadership and communication skills. Played key role in securing second stage funding.

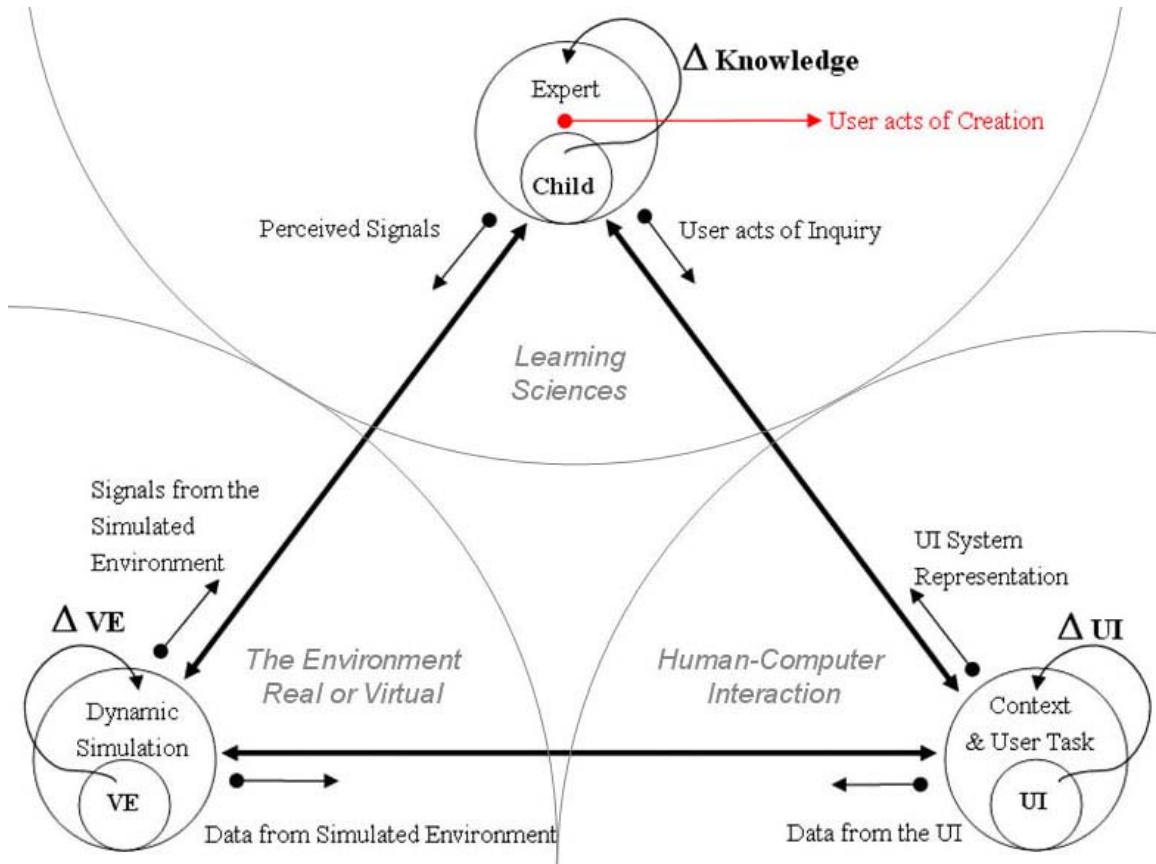
RESEARCH

RESEARCH STATEMENT:

The main direction of this research is theoretical and firmly framed in the intersection of three domains: virtual reality, learning sciences, and human-computer interaction. The PhD investigation, "Simulated Ecological Environments for Education (SEEE): A Tripartite Model Framework of HCI Design Parameters for Situational Learning in Virtual Environments," was an empirical investigation into the interplay of virtual environments, and the mental model of the child, and the search, navigation, augmentation, annotation possibilities of the user-interface. Future work will investigate qualitative and quantitative methods, and causal models to explain the role that ecological context has in the dynamic interaction with cognitive models. This is an aggressive research program that requires collaboration between computer scientists, psychologists, educators, and biologists. The research aim is to use qualitative data fitting techniques to

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investigate the design parameter interaction with mental models and thus evaluate the SEEE Tripartite Model. The future of the research will build on the framework and can represent different kinds of front-ends for simulations. Simulations that represent different scenarios of future realities based on decision support systems and social-environmental analysis. The capability to see the results of different parameters in a high fidelity computer graphics model will be a very powerful decision support system. Unlike the more abstract visualizations, these types of visualizations will empower policy makers to understand the environmental impacts of choices. Public outreach is an important part of this research and envisioned to be a critical component of this work.



TEACHING EXPERIENCE

Twelve years of successful teaching, instruction, mentoring, and curriculum development is brought to the classroom. Excellent student recommendations and evaluations give evidence of success and independent teaching ability. Is comfortable in a wide range of classes, styles and demographics, as is evidence from teaching as few as 10 students to 150 students per class, as few as one class per term to as many as four per term, in-class, lecture, in lab project based learning, blended, to 100% distance mode. Is an established, competent, and independent instructor in designing, developing, and delivering the highest quality classes for undergraduate and graduate students.

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FACULTY (Full Time - Temporary) OF COMPUTER SCIENCE. (January –May, 2009, January 2010 – May 2010, August 2010 - Present)

Department of Computer Science, Slippery Rock University, Slippery Rock, PA

Temporary faculty teaching introductory and advanced courses in computer science:

- **Computer Concepts (CpSc 110).** A computer literacy course stressing the use of applications software on personal computers. It covers a survey of computers and their impact on society and the use of word processing software. Other application software is also covered, such as spreadsheets and database software, but the particular applications examined may vary from section to section.
- **Productivity Software (CpSc 210).** An in-depth, practical study of existing productivity software packages that focuses primarily on decision-support systems for microcomputers. Projects will involve the use of intermediate and advanced features of various software packages, as well as the use of several packages in finding computer-based solutions to information storage and retrieval problems.
- **Management Information Systems (CpSc 365):** Managerial and technological issues that are necessary to understand, establish, manage and use information systems in all functional areas of organizations.
- **Software Project Management (CpSc 443):** An introduction to project management in the information systems, or IT development, area. Provides an understanding of the purpose, methods and benefits of process management by exposing the student to the concepts, practices, processes, tools and techniques used in process management for software development.
- All curriculum materials offered online in both **Blackboard** and **Desire to Learn**. Combined lecture notes with online demonstrations, labs, interactive tutorials, and multi-media to enhance learning experience in computer information systems and technologies, with deep knowledge of distance education technology, curriculum design and deployment.
- **Official evaluations ranked from the department average to above, at 90% student satisfaction.**

ADJUNCT PROFESSOR & VISITING LECTURER OF ART & DESIGN. (May 2009 – December 2009)

Art & Design Division, Chatham University, Pittsburgh, PA

Designed class and curriculum, and independently taught MFA class on *New Media*, and taught undergraduates on *Media Literacy*. The issues surrounding technology convergence and impact on humanity, society, economics, and the Earth's ecology is covered in the theory, practice, and project.

TEACHING FELLOW, ADJUNCT PROFESSOR & VISITING LECTURER and Full Time Ph.D. Student. (2000-2008)

School of Information Sciences, University of Pittsburgh. Pittsburgh, PA.

Over 25 sections independently taught, with over 1,000 students.

Designed class and curriculum, and independently taught introductory course in *Information Science, Human Computer Interaction, Human Factors in System Design, Independent Studies and User Centered Design*, with **official teaching evaluations consistently ranking above average to excellent when directly compared to the department in undergraduate Information Science and Technology**. Combined lecture

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notes with online demonstrations, labs, interactive tutorials and multi-media to enhance learning experience and expose students to possibilities inherent in Internet systems and technologies.

ADJUNCT PROFESSOR

Holyoke Community College Holyoke, MA. (1997)

Taught introductory course in computer concepts. Utilized newly emerging Internet tools and demonstrations as fundamental component of classroom lectures and discussions. Won planning and innovation grant; developed web framework for online, multimedia course materials used by all college educators in institution.

OTHER UNIVERSITY EXPERIENCE

SENIOR CONSULTANT

Legal Studies Department and Center for Information Technology and Dispute Resolution. University of Massachusetts, Amherst, MA. 1997.

Spearheaded system design and development of web-based "Online Ombudsmen Office" that served as effective tool for conflict resolution, policy development, and issue mediation tasks.

Rotman School, MBA Program, University of Toronto, Toronto, Ontario. CAN. 1991 – 1992.

Consulted with university administrators in MBA School to provide expertise and recommendations for technology tools to facilitate student understanding of core "soft skills" concepts. Developed system that allowed for custom video-clip editing and augmentation used to enhance student learning in conflict management, meeting management, leadership, and communication skills. Played key role in securing IBM grant funding for next stage of project development. Presented software at an educational and technology conference.

ACADEMIC SERVICE

Committees:

- ACM SIGGRAPH 2007 – Education Program Committee
- ACM SIGGRAPH 2007 – Paper Review Committee

Volunteer:

- Volunteer for SIS I-Fest – New Student Recruitment. A school fair for prospective students, software posters, software demos, and entertainment Gammng night
- Volunteered for SIS - Alumni Network to review resumes and provided interview coaching.

COMMUNITY VOLUNTEER

- **Board Member on the Fox Chapel Borough Parks Commission**
- **Fox Chapel Schools PTO**
- **Calvary Church Sunday School**
- **Frick Park Environmental Center Earth Day**

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INDUSTRY EXPERIENCE

Professional experience includes financial, strategic, information technology and human-computer interaction activities for global corporations and institutions.

VIRTUAL FIELD TRIPS, INC.

Principle Founder, CEO & CTO

Pittsburgh, PA 2009 – *Present*

(<http://www.myvirtualfieldtrips.com/>)

Virtual Field Trips (VFT) software will harness state-of-the-art video/computer game technology to simulate places of exquisite biological beauty, thereby creating teachable moments filled with exploration, surprise and delight.

- Software development and publication of educational simulations for learning
- Resulted in ~40% learning gains compared to the control group
- Aligned with Pennsylvania standards for science curriculum and the Audubon Society's field trip activity guide
- Requested by all students in the study for continued play
- Unanimously requested by all students' parents for home use

Project Collaborators on a MacArthur Foundation and HASTAC Initiative Digital Media and Learning Grant Proposal:

- Maria C. R. Harrington, Ph.D., CEO Virtual Field Trips, Inc.
- Susan Kalisz, Ph.D., National Science Foundation and University of Pittsburgh, skalisz@nsf.gov
- Jim Bonner, Executive Director Audubon Society of Western Pennsylvania, jbonner@aswp.org
- Pat Siger, Sr. Vice President, YMCA of Pittsburgh, psiger@ymcaofpittsburgh.org
- Joy Marburger, Ph.D., National Park Service, joy_marburger@nps.gov
- Margie Radebaugh, Director of Horticulture and Education, Phipps Conservatory and Botanical Gardens, mradebaugh@phippconservatory.org

ACTIVE INTERFACE, INC.

V.P. Business Development

Pittsburgh, PA 1991 – 2005

FEDERATED INVESTORS

Senior Project Manager

Pittsburgh, PA 1998 – 1999

SENIOR PROJECT MANAGER BUSINESS PLANNING & DEVELOPMENT PROGRAM MANAGER, ADVANCED INFORMATION SYSTEMS

- Responsible for the corporation's internet web site www.federatedinvestors.com for both operations and R&D
- Managed a staff of five full time employees, and outside consultants as needed
- Managed and lead the complete redesigned effort of the web site, for major usability, functional and feature enhancements with respect to end user features, functions and usability and market demand of features

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- Implemented operational efficiencies with the implementation of a framework that delivered on improve accuracy and efficiencies – cut response times from one week to one day
- Cut costs by \$500,000 in the first three months via automation and efficiency operation enhancements
- Lead the interdepartmental team on strategic systems design strategy for XML standards for seamless data and information flow between departments and in support of sales force applications
- Lead the RFP process on numerous cross-departmental requests
- Promoted in less than a year from program manager to senior project manager

FIDELITY INVESTMENTS

Senior Project Manager

Boston, MA 1995 – 1996

SENIOR PROJECT MANAGER, BUSINESS PLANNING & DEVELOPMENT STRATEGIC SYSTEMS GROUP

- Managed and lead the complete redesigned effort of the decision support institutional investment planning software and the data visualization user interface used to support multiple scenario analysis, “FIPS Software System.”
- Delivered major usability, functional and feature enhancements
- Liaison between all divisions and departments with touch points on product
- Traveled extensively to conduct end user interviews, task analysis, product testing and demonstrations
- Responsible for technical specifications delivered to R&D and end user advocate in R&D on features, functions and usability issues
- End user champion and product evangelist

DATAVIEWS WORLDWIDE(GE Fanuc)

Product Marketing Manager

Northampton, MA 1992-1994

- Responsible for entire strategic, communications, marketing and sales strategy
- Competitive analysis of the real-time data visualization marketplace and the translation of analysis into deliverables for both the sales force and new product releases
- End user champion and product evangelist
- Liaison between all divisions and departments with touch points on product
- Traveled extensively to conduct end user interviews, task analysis, product testing and demonstrations

**MANAGER, INFORMATION TECHNOLOGY GLOBAL MONEY MARKETS
DEPARTMENT, INVESTMENT BANK** Canadian Imperial Bank of Commerce
Toronto, Ontario 1991 – 1992

INTERNATIONAL RESEARCH ECONOMIST, ECONOMICS DEPARTMENT
Pittsburgh National Bank Pittsburgh, PA 1988- 1989

PUBLICATIONS

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PEER REVIEWED PUBLICATIONS:

JOURNALS & DISSERTATION PUBLICATIONS:

1. Harrington, M.C.R. (2011). The Virtual Trillium Trail and the Empirical Effects of Freedom and Fidelity on Discovery-based Learning. *Virtual Reality*, **Springer**
2. Harrington, M.C.R. (2010) Empirical evidence of priming, transfer, reinforcement, and learning in the real and virtual trillium trail. *IEEE Transactions on Learning Technologies*, 28 Jul. 2010. IEEE computer Society Digital Library. **IEEE Computer Society**,
<http://doi.ieeecomputersociety.org/10.1109/TLT.2010.20>
3. Harrington, M.C.R. (2009). An Ethnographic Comparison of Real and Virtual Reality Field Trips to Trillium Trail: The Salamander Find as a Salient Event. *Children, Youth and Environments* 19(1): <http://www.colorado.edu/journals/cye>.
4. Harrington, M.C.R (2008). Simulated Ecological Environments for Education (SEEE): A Tripartite Model Framework of HCI Design Parameters for Situational Learning in Virtual Environments. *Dissertation Abstracts International*.

CONFERENCE PUBLICATIONS:

5. Harrington, M.C.R. (2009) Meta-ontologies for learning in virtual and augmented realities. *ACM-SIGCHI IDC'09, The 8th International Conference on Interaction Design and Children Workshop on Children and Mobile Technology: Interface Development for Mobile Touch Devices*. June 3-5, 2009. Como, Italy.
ACM SIGCHI
6. Harrington, M.C.R. (2006). Situational learning in real and virtual space: Lessons learned and future directions. *ACM SIGGRAPH'06*. July 30-August 3, 2006 Boston, MA, USA.
ACM SIGGRAPH
7. Harrington, M.C.R. (2006). Trees of life: Models of children's creative Processes. *ACM DIS'06 Doctoral Consortium*. June 28, 2006 State College, PA, USA.
ACM DIS
8. Harrington, M.C.R. (2008). A demonstration of virtual trillium trail, a simulation of a fourth grade field trip to a wildflower reserve for ecology education. *Open Learning Interplay Symposium 2008*. Demos and poster session. March 10-13, 2008. **CMU**, Pittsburgh, PA USA.
9. Harrington, M. (2005). Virtual Beechwood: Simulated ecological environments for education. *Conference on Spatial Information Theory'05. Doctoral Consortium Abstracts*. September 14-18, 2005 Ellicottville, New York, USA.
10. Gennari, J., Harrington, M., Hughes, S., Manojlovich, M. and Spring, M. (2003). Preparatory observations on ubiquitous knowledge environments: The cyberinfrastructure information ether. *NSF Post Digital Library Futures Workshop*. Chatham, MA, USA.

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PRESENTATIONS & INVITED TALKS:

1. Harrington, M.C.R (April 2010). Reality Matters in Virtual Reality for Learning Sciences Research: The Virtual Trillium Trail Empirical Data and Future fMRI Studies. Conference area Scaife Hall, **Dept of Radiology and Bioengineering, University of Pittsburgh**, April 16, 2010. Pittsburgh, PA USA.
http://washington.sis.pitt.edu/comet/presentColloquium.do?col_id=700
2. Harrington, M.C.R. (2009). The Virtual Trillium Trail: An Educationally Effective Simulation for Ecology Education. *The Pennsylvania Association of Environmental Educators 2009 Conference*. March 19 - 21, 2009. Entriiken, PA USA.
3. Harrington, M.C.R. (2008). Simulated Ecological Environments for Education: Past and Future Realities. November 7, 2008. **Chatham University**, Pittsburgh, PA USA.
4. Harrington, M.C.R. (2008). Tips and Tricks of Building Simulated Ecological Environments for Education: User centered design, activity analysis, prototyping, and techniques. **Carnegie Mellon Entertainment Technology Center**. October 15, 2008. CMU, Pittsburgh, PA USA.
5. Harrington, M.C.R. (2008). The Virtual Trillium Trail: The value of Freedom and Fidelity in the child-computer-environment interface. *Carnegie Mellon Human-Computer Interaction Institute Seminar Series*. September 17, 2008. CMU, Pittsburgh, PA USA.
6. Harrington, M.C.R. (2008). A demonstration of virtual trillium trail, a simulation of a fourth grade field trip to the trillium trail wildflower reserve. *The Pennsylvania Association of Environmental Educators 2008 Conference*. February 29 and March 1, 2008. Ligonier, PA USA.
7. Harrington, M.C.R. (2008). The poetics of games: Art, poetry and storytelling in modern game design. **The Art Institute of Pittsburgh**. January 14, 2008 Pittsburgh, PA USA.
8. Harrington, M.C.R. (2007). Virtual trillium trail and opportunities for education in metaverses and virtual environments. **Phipps Conservatory and Botanical Gardens**, Phipps Education Committee. November 19, 2007 Pittsburgh, PA USA
9. Harrington, M.C.R. (2007). Generating high fidelity, 3D computer graphic models from transects and plot population data for Trillium Trail. *University of Pittsburgh, Department of Biological Sciences: E & E Seminar*. October 24, 2007 Pittsburgh, PA, USA.

TECHNICAL REPORTS:

Harrington, M.C.R. (2006) Simulated ecological environments for education (SEEE): A tripartite model framework of HCI design parameters for situational learning in virtual environments. *Unpublished Dissertation Proposal*, May 2006. School of Information

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Sciences, Department of Information Sciences and Telecommunications. University of Pittsburgh. Pittsburgh, PA.

Harrington, M.C.R. (2005) Simulated Ecological Environments for Education (SEEE). *Unpublished State of the Art Literature Review Component of the Comprehensive Exam*, August 2005. School of Information Sciences, Department of Information Sciences and Telecommunications. University of Pittsburgh. Pittsburgh, PA.