MARY C. WHITTON US CITIZEN

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University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-3175
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EDUCATION

M.S. Electrical and Computer Engineering (1984)

North Carolina State University, Raleigh, NC

Thesis Title: Special Purpose Hardware for the Display of Free-Form Surfaces

M.S. Guidance and Personnel Services (1974)

North Carolina State University, Raleigh, NC

Thesis Title: Same-Sex and Cross-Sex Reliability and Concurrent Validity of the Strong-Campbell Interest Inventory

B. A. Religion (1970)

Duke University, Durham, NC

CONTINUING EDUCATION

Managing at Sun, 1991, In-house program at Sun Microsystems, Inc.; 40 hours

Program for Technology Managers, 1985, UNC-CH Kenan-Flagler Business School; 100 hours

Product Planning and Management, 1982, McGraw-Hill Seminar Center; 24 hours

EMPLOYMENT

Department of Computer Science, University of North Carolina at Chapel Hill

Research Associate Professor, July 2004 – present

Research Assistant Professor, May 1995 – July 2004

Manager of Virtual Environments Research Projects, November 1994-May 1995

RENCI (Renaissance Computing Institute) at University of North Carolina at Chapel Hill

Senior Project Manager (80%FTE), Jan 2011-present

Domain Scientist, Computer Science (25% FTE), August 2008 - September 2009

Sun Microsystems, Inc. (Sun acquired Trancept Systems, Inc. May 1987)

Sun Microsystems Laboratories, July 1993 – October 1994

Director of Marketing, Advanced Visualization Products, June 1987 – July 1993

Trancept Systems, Inc.

Vice President Sales and Marketing and Co-Founder, January 1986 – May 1987

Adage, Inc. (Adage acquired Ikonas, October 1982)

Director of Marketing—Graphics Terminals, October 1982 – August 1986 (Academic Leave June 1993 – December 1984)

Ikonas Graphics Systems, Inc.

Vice President and Co-Founder, July 1978 – October 1982

N.C. Public Schools, Middle School Mathematics Teacher 1973-1976

RESEARCH INTERESTS

Effective Virtual Environments (EVE) Research Team (with Fred Brooks)

- What makes virtual environments work? How do technical and content factors influence their effectiveness?
 - How do we show VEs are worthwhile?
- Tools for Serious Games and VE Applications: Application to Physical Therapy
 - Improving scenario/rehabilitation session generation tools for physical therapists
 - How can we use logs from training systems (and games) to evaluate trainee/player performance?

- Can we diagnose the cause of a trainee/player's poor performance from the logs?
- Can we use the measured performance to automatically drive the scenario/session generation tools?

PUBLICATIONS

Author or co-author of over 50 publications including: 10 book chapters, 36 reviewed papers, 5 invited papers, 20 other conference papers, and 6 posters/abstracts. Full list is included at the end of this document. (<u>Jump to publications</u>)

FUNDING

2000-2008 ONR VIRTE Project \$1,480,000

Topic: Effective Virtual Environments Fred Brooks and Mary Whitton Co-PIs

1998-2002 Supplement to NIH NCRR GRIP/CISMM ~\$450,000/year

Topic: Design, Develop, Deploy, and Evaluate a System for Distributed Collaboration

Supplement PIs: R. Superfine and R. Taylor Project Leads: Mary Whitton and Diane Sonnenwald

GRADUATE STUDENT COMMITTEES

Co-Advisor with Fred Brooks: 7 graduated (B.Insko, M.Meehan, B.Lok, S.Razzaque, E.Burns, J.Jerald,

J.Wendt); 2 ongoing (J. Feasel, R. Skarbez)

Co-Advisory with Henry Fuchs: T. Peck

Other PhD Committee Memberships: 14 graduated; 2 ongoing: L. Kohli, R. Schubert

SELECTED DEPARTMENT AND PROFESSIONAL SOCIETY SERVICE

Chair, Computer Science Department Local IRB Committee (2002-2010)

Chair of UNC Research Exhibits at SIGGRAPH 1997, 2002

400 and 800 square feet, respectively, for 1997 and 2002. Over 25 students and faculty involved each year and each exhibit was open for over 40 hours. User study conducted in 2002 resulted in IEEE VR publication (Meehan, et al. 2003).

ACM Professional Society: Member since 1978.

ACM History Committee: Member (2010-present)

ACM SIG Board: Member (1993-1997); ACM Council: Member (1998-2000);

ACM SIGGRAPH: President (1993-1995), Executive Committee (1990-1999), Chair *ACM SIGGRAPH in the 20th Century* Long Range Planning Conference (1994); Chair, Task Force on Computer Graphics History (2010- present); General Chair of Symposium on Interactive 3D Graphics (2001); frequent reviewer for SIGGRAPH, Symposium on Interactive 3D Graphics, and Applied Perception in Graphics and Visualization, *Transactions on Applied Perception*.

IEEE and IEEE Computer Society: Member since 1980, Senior Member 2009

Frequent reviewer and program committee member for IEEE Virtual Reality, IEEE Workshop on 3D User Interfaces. Reviewer for *Transactions on Visualization and Computer Graphics*.

Other reviewing: Presence, Computers and Graphics, International Journal of Virtual Reality, ACM CHI conference.

AWARDS AND HONORS

1998	Inclusion in "Computer Graphics Pioneers" Portrait Gallery, SIGGRAPH 98
1983	Wake County (NC) Businesswoman of the Year, American Business Women's
	Association
1978	Tau Beta Pi Engineering Honor Society
1971-1973	National Defense Education Act Fellowship, N. C. State University
1966-1970	Angier B. Duke Scholarship, Duke University

PUBLICATIONSMary C. Whitton

PUBLICATIONS: BOOK CHAPTERS

In preparation

Whitton, M.C. and Peck, T.C. Stepping-Driven Locomotion Interfaces.

2008

- Whitton, M.C. and Brooks, F.P. (2008). Evaluating VE Component Technologies. In The PSI Handbook of Virtual Environments for Training and Education: Vol.2. VE Components and Training Technologies, Schmorrow, Cohn, J., and Nicholson, D., (Series Eds.), Nicholson, D., Schmorrow, D. and Cohn, J. (Vol. Eds.), (pp 240-261). Westport, CN: Praeger Security International.
- Whitton, M.C. and Loftin, R..B (2008). Section Perspective: VE Component Technologies. In The PSI Handbook of Virtual Environments for Training and Education: Vol.2. VE Components and Training Technologies, Schmorrow, Cohn, J., and Nicholson, D., (Series Eds), Nicholson, D., Schmorrow, D. and Cohn, J. (Vol. Eds.), (pp.1-14). Westport, CN: Praeger Security International.
- Whitton, M.C. and Wendt, J., (2008). Section Perspective Appendix A: Modeling and Rendering. In The PSI Handbook of Virtual Environments for Training and Education: Vol.2. VE Components and Training Technologies, Schmorrow, Cohn, J., and Nicholson, D., (Series Eds), Nicholson, D., Schmorrow, D. and Cohn, J. (Vol. Eds.), (pp. 15-20). Westport, CN: Praeger Security International.
- Sonnenwald, D.H., Whitton, M.C. & Magluaghlin, K. (2008). Evaluation of a scientific collaboratory system: Investigating a collaboratory's potential before deployment. In, Scientific Collaboration on the Internet, G. Olson, A. Zimmerman & N. Bos (Eds.), (pp.171-194).Boston: MIT Press.
- Whitton, M.C. & Razzaque, S. (2008a). Locomotion. In HCI Beyond the GUI: Design for Haptic, Speech, Olfactory and Other Nontraditional Interfaces, Kortum, P. (Ed.), (pp 107-146). Burlington, MA: Morgan Kaufmann.
- Whitton, M., & Razzaque, S. (2008b). Locomotion Interfaces Case Study. (Companion Case Study to Whitton & Razzaque 2008a). In Web supplement to HCI Beyond the GUI: Design for Haptic, Speech, Olfactory and Other Nontraditional Interfaces, Kortum, , P. (Ed.), Retrieved February 13, 2009, from http://books.elsevier.com/companions/9780123740175/casestudies/Case Study 04.pdf

Before 2008

- Taylor II, R. M., D. Borland, F. P. Brooks, Jr., M. Falvo, M. Guthold, T. Hudson, K. Jeffay, G. Jones, D. Marshburn, S. J. Papadakis, L. C. Qin, A. Seeger, F. D. Smith, D. H. Sonnenwald, R. Superfine, S. Washburn, C. Weigle, M. C. Whitton, P. Williams, L. Vicci and W. Robinett (2003). Visualization and Natural Control Systems for Microscopy. In Visualization Handbook, C. Johnson, C. Hansen (Ed.s), (pp. 875-900). Boston:Elsevier-Butterworth Heinemann.
- Sonnenwald, Diane, R. Berquist, K. Maglaughlin, E. Kupstas Soo, M. Whitton (2001). Designing to Support Scientific Research Across Distances: the nanoManipulator Environment. In Collaborative Virtual Environments, E. Churchill, D. Snowdon, and A. Munro (Ed.s), (pp. 202-224).London: Springer Verlag,
- Whitton, Mary C. (1990). Requirements for Scientific Visualization: Evolution of an Accelerator Architecture. In Visualization in Supercomputing, Mendez, Raul (Ed.), (pp.117-129). New York: Springer-Verlag.
- Whitton, Mary C. (1988). Memory Design for Raster Graphics Displays. In IEEE Tutorial: Computer Graphics Hardware, Image Generation, and Display, Reghbati, H. and Lee, A. (Ed.s) IEEE Computer Society Press, 1988, (pp. 116-133). (Originally published in IEEE Computer Graphics and Applications, 4(3) (March 1984), 48-65.)

PUBLICATIONS: REVIEWED—JOURNALS AND SIGNIFICANT CONFERENCES

Note: The conference papers included here were reviewed by at least three reviewers and acceptance rates range from under 20% to 30%. The papers were presented at the conference and full text is included in the conference proceedings.

2012

- Jerald, J., Whitton, M., Brooks, F. (2012). Scene-Motion Thresholds During Head Yaw for Immersive Virtual Environments. ACM Transaction on Applied Perception (*to appear January 2012*).
- Peck, T.; Fuchs, H.; Whitton, M. (2011) The Design and Evaluation of a large-Scale Real-Walking Locomotion Interface. IEEE Transactions on Visualization and Computer Graphics (*to appear 2012*). Digital Object Identifier: 10.1109/TVCG.2011.289 (early access).
- Lewek MD, Feasel J, Wentz E, Brooks Jr FP and Whitton MC. The use of visual and proprioceptive feedback to improve gait speed and spatiotemporal symmetry following chronic stroke a case series. Phys Ther (*to appear*).

2011

- Feasel, J., Whitton, M., Kassler, L., Brooks, F.P., Lewek, M. (2011) The Integrated Virtual Environment Rehabilitation Treadmill System, Neural Systems & Rehabilitation Engineering, IEEE Transactions on, 19(3): 290-297.
- Peck, T., Fuchs, H., & Whitton, M. (2011). An Evaluation of Navigational Ability Comparing Redirected Free Exploration with Distractors to Walking-in-Place and Joystick Locomotion Intefaces. Proceedings of IEEE Virtual Reality 2011 (Singapore, March 19-23, 2011), 55-62. Honorable Mention for Best Paper.

2010

- Peck, T., Fuchs, H., & Whitton, M.. (2010). Improved Redirection with Distractors: A Large Scale Real Walking Locomotion System and its Effect on Navigation in Virtual Environments. Proceedings of IEEE Virtual Reality 2010 (Waltham, MA March 2010), 35-38.
- Wendt, J., Whitton, M. C., & Brooks, F. B. (2010). GUD WIP: Gait-Understanding-Driven Walking-In-Place. Proceedings of IEEE Virtual Reality 2010 (Waltham, MA March 2010), 51-58.
- Taylor II, R., Jerald, J., VanderKnyff, C., Wendt, J., Borland, D., Marshburn, D., Sherman, W., Whitton, M. (2010). Lessons about Virtual Environment Software Systems from 20 Years of VE Building. Presence: Teleoperators and Virtual Environments. April 2010, 19(2), pp. 162-178. DOI: 10.1162/pres.19.2.162

2009

- Jerald, J., M. Whitton (2009). Relating Scene-Motion Thresholds to Latency Thesholds for Head-Mounted Displays. Proceedings of IEEE Virtual Reality 2009 (Lafayette, LO March 2009), pp. 211-218.
- Jerald, J., F. Steinicke, and M. Whitton (2009). Scene-motion thresholds correlate with angular head motions for immersive virtual environments. In Proceedings of Advances in Computer-Human Interaction, pages 69–75, 2009. IEEE:New York. This paper received an award as one of the top 10% of papers at the conference.
- Peck, T., H. Fuchs, M. Whitton (2009). Evaluation of Reorientation Techniques for Walking in Large Virtual Environments. Transactions on Visualization and Computer Graphics 15(3) pp.383-394. Washington:IEEE Press. PMID: 19282546 [PubMed indexed for MEDLINE]PMCID: PMC2844119

2008

- Feasel, J., M.C.Whitton, J.D. Wendt, (2008). LLCM-WIP: Low-Latency, Continuous-Motion Walking-in-Place. Proceedings of IEEE Symposium on 3D User Interfaces 2008(Reno, NV March 2008), 97-104.
- Jerald, J., Peck, T., Steinicke, F., Whitton, M. (2008). Sensitivity to Scene Motion for Phases of Head Yaws. Proceedings of Applied Perception in Graphics and Visualization 2008 (Los Angeles, August 2008), pp. 155-132,. ACM.
- Mihalik JP, Whitton MC, & Kohli L, (2008). Do the physical characteristics of a virtual reality device contraindicate its use for balance assessment? Journal of Sport Rehabilitation, 2008, 16(38-49).
- Peck, Tabitha, M. Whitton, H. Fuchs (2008). Evaluation of Reorientation Techniques for Walking in Large Virtual Environments. Proc. of IEEE Virtual Reality 2008 (Reno, NV March 2008), 121-127. Honorable Mention in Best Paper competition.

2007

- Burns, Eric, Sharif Razzaque, Mary C. Whitton, Frederick P. Brooks, Jr., (2007) MACBETH: Management of Avatar Conflict by Employment of a Technique Hybrid. International Journal of Virtual Reality, 6(2):11-20.
- Glencross, M., C. Jay, J. Feasel, L, Kohli, M. Whitton, R. Hubbold (2007). Effective Cooperative Haptic Interaction over the Internet. Proc. of IEEE Virtual Reality 2007, (Charlotte, NC Mar 2007), 115-122.

2006

Burns, E., Razzaque, S., Panter, A. T., Whitton, M. C., McCallus, M. R., & Brooks, F. P. (2006) The Hand is Slower than the Eye: A quantitative exploration of visual dominance over proprioception. Journal on Presence: Teleoperators and Virtual Environments, 15(1), 1-15, February 2006. (Invited extended version of IEEE VR 2005 conference paper.)

2005

- Burns, E., Razzaque, S., Panter, A. T., Whitton, M. C., McCallus, M. R., & Brooks, F. P. (2005) The Hand is Slower than the Eye: A quantitative exploration of visual dominance over proprioception. Proceedings of IEEE Virtual Reality 2005, (Bonn, Germany March 2005), 3-10, IEEE Computer Society. Honorable Mention in Best Paper Competition.
- Whitton, M., Cohn, J., Feasel, J., Zimmons, P., Razzaque, S., Poulton, S., McLeod, B., Brooks, F. (2005). Comparing VE Locomotion Interfaces. Proceedings of IEEE Virtual Reality 2005, (Bonn, Germany March, 2005), 123-130, IEEE Computer Society.
- Meehan, M., S. Razzaque, B. Insko, M. Whitton, F. Brooks (2005). Review of Four Studies on the Use of Physiological Reaction as a Measure of Presence in Stressful Virtual Environments. Applied Psychophysiology and Biofeedback, 30 (3), 239-258.

2004

- Hudson, T., A. Helser, D. Sonnenwald, M. Whitton (2004). Managing Collaboration in the nanoManipulator. Journal on Presence: Teleoperators and Virtual Environments, 13(2), 193-210.
- Lok, Benjamin, Samir Naik, Mary Whitton, and Frederick Brooks (2003). Effects of Interaction Modality and Avatar Fidelity on Task Performance and Sense of Presence in Virtual Environments. Journal on Presence: Teleoperators and Virtual Environments, 12(6), 615-628.
- Sonnenwald, Diane H., K. Maglaughlin, M. Whitton (2004). Designing to Support Situation Awareness across Distances: An Example from a Scientific Collaboratory. Information Processing & Management, 40(6), 989-1011

2003

Lok, B.C., S. Naik, M. Whitton, F. Brooks, (2003). Incorporating Dynamic Real Objects into Immersive Virtual Environments. Proceedings of ACM Symposium on Interactive 3D Graphics (Monterey, CA April 2003), 31-40. Selected for short presentation at SIGGRAPH 2003 with one page summary in ACM Transactions on Graphics 22(3), 701 (Proceedings of SIGGRAPH 2003, San Diego).

- Lok, B.C., S. Naik, M. Whitton, F. Brooks (2003), Effects of Handling Real Objects and Self-Avatar Fidelity on Cognitive Task Performance in Virtual Environments. Proceedings of IEEE Virtual Reality 2003 (Los Angeles, CA, March 2003), 125-132, IEEE Computer Society.
- Hudson, T., A. Helser, D. Sonnenwald, M. Whitton, Managing Collaboration in the nanoManipulator (2003). Proceedings of IEEE Virtual Reality 2003 (Los Angeles, CA, March 2003), 180-187, IEEE Computer Society.
- Meehan, M., S. Razzaque, M. Whitton, F. Brooks (2003), Effects of Latency on Presence in Stressful Virtual Environments. Proceedings of IEEE Virtual Reality 2003 (Los Angeles, CA, March 2003), 141-148, IEEE Computer Society.
- Sonnenwald, Diane H., M. Whitton, K. Maglaughlin (2003) Evaluating a Scientific Collaboratory: Results of a Controlled Experiment. ACM Transactions on Computer Human Interaction, 10(2), 151-176.

2002

- Sonnenwald, Diane H., Mary Whitton, Kelly Maglaughlin (2002) Scientific Collaboratories: Evaluating their Potential. Bulletin of the American Society for Information Science & Technology, Aug/Sep2002, 28(6), 12-15.
- Meehan, M., B. Insko, M. Whitton and F. P. Brooks Jr. (2002). Physiological Measures of Presence in Stressful Virtual Environments. ACM Transactions on Graphics 21(3): 645-652. (Proceedings of ACM SIGGRAPH 2002, San Antonio, Texas).

Pre-2000

- Usoh, Martin, K. Arthur, M. Whitton, A. Steed, M. Slater, and F. Brooks, Walking>Virtual Walking>Flying, in Virtual Environments. Proceedings of SIGGRAPH'99 (Los Angeles, CA, August 11-13), Computer Graphics Annual Conference Series, 1999, pp. 359-364.
- Aliaga, D., J. Cohen, A. Wilson, E. Baker, H. Zhang, C. Erikson, K. Hoff, T. Hudson, W. Stuerzlinger°, R. Bastos, M. Whitton, F. Brooks, D. Manocha, (1999). MMR: An Interactive Massive Model Rendering System Using Geometric And Image-Based Acceleration. Proceedings of the 1999 ACM Symposium on Interactive 3D Graphics (Atlanta, GA, April 26-28, 1999), pp. 199-206, 237.
- Garrett, William, H. Fuchs, M. Whitton, A. State. Real-Time Incremental Visualization of Dynamic Ultrasound Volumes Using Parallel BSP Trees. Proceedings of IEEE Visualization '96 (San Francisco, California, October 1996), pp.235-240, 490.
- State, A., Livingston, M. A., Hirota, G., Garrett, W. F., Whitton, M. C., Fuchs, H. and Pisano, E. D. Technologies for Augmented-Reality Systems: Realizing Ultrasound-Guided Needle Biopsies. Proceedings of ACM SIGGRAPH '96 (New Orleans, LA, August 4-9), Computer Graphics Annual Conference Series 1996, 439-446.
- Whitton, Mary C. (1975). Same-Sex and Cross-Sex Reliability and Concurrent Validity of the Strong-Campbell Interest Inventory. Journal of Counseling Psychology, 22(3), 204-209 (May 1975). APA.

PUBLICATIONS: OTHER PAPERS

2010-present

- Whitton, M.C. and Brooks, Jr., F.P. (2011). Experiences with Different Measurement Types (What works? Evaluating VE System Components and Interaction Techniques). Marine Corps Warfighting Laboratory Workshop: Physiological Metrics of Immersion. October 12, 2011; San Diego, CA. (Invited)
- Sadagic, A. and Whitton, M.C. (2011). Understanding What Affects Our Experiences in Virtual nvironments: Basic Concepts & Definitions. Marine Corps Warfighting Laboratory Workshop: Physiological Metrics of Immersion. October 12, 2011; San Diego, CA. (Invited)

2006 to 2009

Whitton, M. C. (2009). User Evaluation during Development: Lessons Learned from Ten Years of Studies of Virtual Environments. Computer Science Technical Report TR09-015. (Prepared for SIGGRAPH 2009 Course: The Whys, How tos, and Pitfalls of User Studies.)

- Jerald, J, A. Fuller, A. Lastra, M. Whitton, L. Kohli, F. Brooks. (2007) Latency Compensation by Horizontal Scanline Selection for Head-Mounted Displays. In Proceedings of SPIE Vol 6490 Stereoscopic Displays and Virtual Reality Systems. (San Jose, CA, January 2007)
- Muller, P., J. Cohn, D. Schmorrow, R. Stripling, K.Stanney, L., Milham, M. Whitton, J. Folkes (2006). The Fidelity Matrix: Mapping System Fidelity to Training Outcome. Proceedings of I/ITSEC 2006, (Orlando, FL December 2006).
- Brooks, Jr., F. P., J. Cannon-Bowers, H. Fuchs, L. McMillan, M. Whitton (2006). Virtual Environment Training for Dismounted Teams—Technical Challenges. Paper presented at Human Factors & Medicine Panel Workshop on Virtual Media for Military Applications, U.S. Military Academy, West Point, NY, June 13-15, 2006. (Invited)

2000-2005

- Brooks, F., Cannon-Bowers, J., Fuchs, H., McMillan, L, Whitton, M., (2005). A New VE Challenge: Immersive Experiences for Team Training. Proceedings of HCI International 2005, v.9 (Las Vegas, July 2005). CD-ROM. (Invited)
- Whitton, M., B. Lok, B. Insko, F. Brooks, Integrating Real and Virtual Objects in Virtual Environments. Proceedings of HCI International 2005, v.9 (Las Vegas, July 2005). CD-ROM. (Invited)
- Kohli, L., Whitton, M. (2005). The Haptic Hand: Providing User Interface Feedback with the Non-Dominant Hand in Virtual Environments. Proceedings of Graphics Interface 2005 (Victoria, BC, May 2005), 1-8.
- Lok, Benjamin, Samir Naik, Mary Whitton, and Frederick Brooks (2004). Experiences in Extemporaneous Incorporation of Real Objects in Immersive Virtual Environments. in Beyond Glove and Wand Based Interaction Workshop, IEEE Virtual Reality 2004, Chicago, IL.
- Whitton, Mary C., Making Virtual Environments Compelling. Communications of the ACM, 46 (7), 40-47. (Invited)
- Mortensen, J., V.Vinayagamoorthy, M. Slater, A. Steed, B. Lok, M. Whitton, Collaboration in Tele-Immersive Environments. Proceedings of the Eighth Eurographics Workshop on Virtual Reality (2002), 93-101, ACM-The Eurographics Association.
- Razzaque, S., D. Swapp, M. Slater, M. C. Whitton and A. Steed (2002). Redirected Walking in Place. Proceedings of Eighth Eurographics Workshop on Virtual Environments (2002), 123-130, ACM The Eurographics Association.
- Razzaque, S. Z. Kohn, M. Whitton (2001). Redirected Walking, Proceedings of Eurographics 2001, pp. 289-294. September 2001, Manchester, UK.
- Hudson, Thomas, D. Sonnenwald, K. Maglaughlin, M. Whitton, R. Bergquist (2000). Enabling Distributed Collaborative Science [refereed video-paper]. Video Proceedings of ACM Conference on Computer-Supported Collaborative Work 2000.

Pre-2000

- Arthur, K, T. Preston, R. Taylor, F. Brooks, M. Whitton, W. Wright (1998). Designing and Building the PIT: a Head-Tracked Stereo Workspace for Two Users. 2nd International Immersive Projection Technology Workshop, Workshop CD-ROM, Carolina Cruz-Neira, ed., Iowa State University, Ames, Iowa, May 11-12, 1998.
- Fuchs, H., State, A., Livingston, M., Garrett, W., Hirota, G., Whitton, M. & Pisano, E. (1996). Virtual Environments Technology to Aid Needle Biopsies of the Breast: An example of real-time data fusion. Medicine meets virtual reality: Health care in the information age (Medicine Meets Virtual Reality (4th: 1996: San Diego, Calif.), Sieberg, H., Weghorst, S., & K. Morgan (Eds.). IOS Press and Ohmsha.
- Whitton, Mary C., Visualization Accelerators. NCGA '89 Conference Proceedings (Philadelphia, April 17-20), vol.1, 331-339.
- Whitton, Mary C., Accelerating Interactive Applications. NCGA Computer Graphics '87 (Philadelphia, March22-26), Conference Proceedings, vol. 3, 439-448.

PUBLICATIONS: ABSTRACTS . POSTERS. AND VIDEO PAPER

- Welch, G., D. Rivera-Gutierrez, et al. (2011). "Poster Abstract) Physical Manifestations of Virtual Patients. *Simulation in Healthcare* Dec 2011; (12th International Meeting on Simulation in Healthcare (Jan 2012)).
- Skarbez, R., A. Kotranza, Brooks, F.P., Lok,B., Whitton, M. (2011). An Initial Exploration of Conversational Errors as a Novel Method for Evaluating Virtual Human Experiences (Poster Abstract). Proceedings of IEEE Virtual Reality 2011, p.241-242 (Singapore, March 2011).
- Kassler, L., J. Feasel, M. Lewek, F.P. Brooks, M Whitton (2010). Matching Actual Treadmill Walking Speed and Visually Perceived Walking Speed in a Projection Virtual Environment (Poster Abstract). Proceedings of ACM Applied Perception in Visualization and Graphics 2010, p. 161. (Los Angeles, July 2010).
- Burns, E., S. Razzaque, M. Whitton, F. Brooks (2007), MACBETH: The avatar which I see before me and its movement toward my hand (Poster Abstract). Proceedings of IEEE Virtual Reality 2007, p. 295-296 (Charlotte, NC, March 2007). IEEE Computer Society.
- Cohn, Joseph (LT), M. Whitton, W. Becker, F. Brooks, Information Presentation and Control Method Impact Performance on a Complex Virtual Locomotion Task (Poster). Human Factors and Ergonomics Society's 48th Annual Meeting (New Orleans, Louisiana, September 20-24, 2004).
- Sonnenwald, D.H., Maglaughlin, K.L., & Whitton, M.C. (2001). Using innovation diffusion theory to guide collaboration technology evaluation: Work in progress (Video Paper). IEEE 10th International Workshop on Enabling Technologies: Infrastructure for Collaborative Enterprises.

PRESENTATIONS

- Sadagic, A. & Whitton, M.C. (2011). Understanding What Affects Our Experiences in Virtual Environments: Basic Concepts & Definitions. . Marine Corps Warfighting Laboratory Workshop: Physiological Metrics of Immersion. October 12, 2011; San Diego, CA.
- Whitton, M.C. (2011). What works?: Evaluating VE System Components and Interaction Techniques. Marine Corps Warfighting Laboratory Workshop: Physiological Metrics of Immersion. October 12, 2011; San Diego, CA.
- Whitton, M.C. (2011). Exploiting Perception and Biomechanics in Virtual Walking Interfaces. DARPA Workshop on Bionavigation. May 24, 2011; Arlington, VA.
- Whitton, M.C. (2010). Keynote—Getting from here to there: Locomotion in Virtual Environments, ACM Distributed Systems and Real Time.
- Whitton, M.C., (2010) Panelist. Design for Experience?! IEEE Virtual Reality 2010, March 2010 (Wlatham, MA).
- Whitton, M.C. (2009). Course Presentation: User Evaluation during Development, Course: The Whys, Howtos, and Pitfalls of User Studies. ACM SIGGRAPH 2009. New Orleans, August 3, 2009.
- Whitton, M.C. (2009). Panel Organizer and Moderator. Latency in Virtual Environments. IEEE Virtual Reality 2009 (Lafayette, LO March 2009). IEEE Computer Society.
- Whitton, M.C. (2008). The Illusion of Reality. Keynote Presentation at 7th Theory and Practice of Computer Graphics, Eurographics Association, UK Chapter (Manchester, UK; June 9, 2008).
- Whitton, M.C. (2008) Illusion, Reality, & Presence: Ruminations on the State of Virtual Reality. Presentation at UK SIGGRAPH Chapter Meeting (Manchester, UK; June 11, 2008).
- Whitton, M.C. (2008) Whitton, M.C. (2008). Panelist. Getting around in VR, B. Mohler (Organizer), IEEE Virtual Reality 2008, (Reno, NV, March 2008). IEEE Computer Society.
- Whitton, M.C. (2006). Panelist. How Do We Solve Human Factors for VR and AR Applications? Mark Livingston (Organizer). IEEE Virtual Reality 2006, (Alexandria, VA, March 2006). IEEE Computer Society.