Curriculum Vitae

Robert W. Lindeman

All publications and course web pages available at http://www.cs.wpi.edu/~gogo/

Background

Education

Sc.D. in Computer Science, The George Washington University, May 1999
Dissertation: Bimanual Interaction, Passive-Haptic Feedback, 3D Widget Representation, and Simulated Surface Constraints for Interaction in Immersive Virtual Environments
Advisors: James K. Hahn and John L. Sibert
M.S. in Systems Management, The University of Southern California, December 1992
B.A. in Computer Science, *Cum Laude*, Brandeis University, May 1987

Work Experience

7/10-present	Associate Professor Department of Computer Science, Worcester Polytechnic Institute, Worcester, MA
7/05-6/10	Assistant Professor Department of Computer Science, Worcester Polytechnic Institute, Worcester, MA
7/99-6/05	Assistant Professor (non-tenure track) Department of Computer Science, The George Washington University, Washington, DC
9/93-5/99	Graduate Teaching Assistant (Course Instructor) Department of Computer Science, The George Washington University, Washington, DC
Summers 02-06	Visiting Research Scientist, ATR Media Information Science Lab, Kyoto, Japan
Summers 98-00	Contract Researcher in Virtual Environments, Naval Research Laboratories, Washington, DC.
7/96-6/98	Sponsored Researcher / Lead Designer and Programmer, The Laboratory for Advanced Computer Applications in Medicine, The George Washington University, Washington, DC.
10/87-5/93	Project Leader, Repas GmbH, Dreieich, Germany. Led a team of software developers in the design, implementation, and deployment of factory control systems for European clients.

Teaching

Teaching Innovations at WPI

1. Designed, created, and delivered from scratch an advanced technical **Interactive Media & Game Development** (IMGD) course (IMGD-3000) taken by all tech-track IMGD majors. The course uses a combination of smaller programming assignments and a term-long project done in teams to expose students to the low-level details of modern game engines. Each class meeting includes about 30 minutes of lecture, followed by a hands-on, in-class activity to drive home the topics covered.
2. Instituted the co-teaching of two sections of IMGD-1001: The Game Development Process, one of the IMGD "core" courses taken (mostly) by IMGD freshmen, to involve a veteran of the game industry (Kent Quirk). The offerings provided a balanced academic/industry view of the game-development process, helping to solidify many of the topics.
3. Designed, created, and delivered (twice) a new IMGD undergraduate course (IMGD-3100) on the use of alternative input/output devices in game design and development. This course exposes students to the intricacies of programming for "new" devices, such as motion sensors, multi-touch screens, touch feedback devices, and mobile devices. In addition, the characteristics of the human sensory systems are studied. Both of these topics are brought together to study their affects on game design.
4. Designed, created, and delivered a new IMGD graduate course on Immersive HCI (IMGD-5100), covering the design and implementation of interfaces for effective interaction in virtual and augmented reality. This course is one of four core courses in the IMGD MS degree program launching in Fall 2011.
5. Significantly revised CS-4731: Computer Graphics through the introduction of in-class exercises and a longitudinal project to provide scaffolding for course topics.

6. Designed, created, and delivered a CS graduate special-topics course on Building Effective Virtual Worlds (Spring 08), which centered around the design and evaluation of immersive virtual environments.
7. Designed, created, and delivered a CS graduate special-topics course on 3D User Interaction (Spring 07), which centered around the design and evaluation of input techniques for tasks performed in virtual environments.
8. Initiated the creation of a Project Center in Kansai, Japan. To date, three WPI senior capstone projects (MQPs) have been completed in Kansai, Japan.

Honors, Awards, and Other Recognition Related to Teaching

AW1 2011 Provost's MQP Award for IMGD
AW2 2010 Provost's MQP Award for IMGD
AW3 2010 Provost's MQP Award for Professional Writing
AW4 2009 Provost's MQP Award for IMGD
AW5 **2008 WPI Romeo Moruzzi Young Faculty Award for Innovation in Undergraduate Education**
AW6 2008 Provost's MQP Award for IMGD
AW7 2008 Provost's MQP Award for CS
AW8 2000-2001 "Teacher of the Year." Voted by CS Seniors to have had "the greatest impact" on them at GW
AW9 2001-2002 "Teacher of the Year." Voted by CS Seniors to have had "the greatest impact" on them at GW
AW10 2003-2004 "Teacher of the Year." Voted by CS Seniors to have had "the greatest impact" on them at GW
AW11 2004-2005 "Teacher of the Year." Voted by CS Seniors to have had "the greatest impact" on them at GW

Scholarship

Publications

A note on author listings: Ordering of names is based on level of contribution. Names of students are in **bold**.

Peer-Reviewed Journal Papers

J1 Lindeman, R.W., Reiners, D., Steed, A. "Practicing What We Preach: IEEE VR 2009 Virtual Program Committee Meeting," *IEEE Computer Graphics and Applications*, 29(2), March/April, 2009, pp. 80-83.
J2 **Orman, N.**, Kim, H., Sakamoto, R.,Toriyama, T., Kogure, K., Lindeman, R. "GPU-Based Optimization of a Free-Viewpoint Video System," *Electronic Letters on Computer Vision and Image Analysis (ELCVIA)*, 7(2), 2008, pp. 120-133.
J3 Lindeman, R.W., Yanagida, Y., Noma, H., Hosaka, K. "Wearable Vibrotactile Systems for Virtual Contact and Information Display," Special Issue on Haptic Interfaces and Applications, *Virtual Reality*, Mar. 2006, pp. 203-213.
J4 **Niwa, M.**, Noma, H., Yanagida, Y., Hosaka, K., Lindeman, R.W. "Controlling the Perceived Vibrational Status of the Tactor by Vibrotactile Feedback," *Transactions of the Virtual Reality Society of Japan*, 11(1), 2006, pp. 59-68.
J5 Lindeman, R.W., Templeman, J.N., Sibert, J.L., **Cutler, J.R.** "Handling of Virtual Contact in Immersive Virtual Environments: Beyond Visuals," *Virtual Reality*, 6(3), 2002, pp. 130-139.
J6 **Kann, C.**, **Lindeman, R.W.**, Heller, R.S. "Integrating Algorithm Animation into a Learning Environment," *Computers and Education*, 28(4), 1997, pp. 223-228.

Invited Journal Paper

I1 Lindeman, R.W. "Making VR More Usable: The State of Effectiveness in Virtual Reality," *Journal of the Virtual Reality Society of Japan*, 11(1), 2006, pp. 24-27.

Edited Volumes

E1 Steed, A., Reiners, D., Lindeman, R.W. (editors) *Proc. of the IEEE Virtual Reality 2009 Conf.*, IEEE.
E2 Saito, H., Yanagida, Y., Lindeman, R.W. (editors). *Proc. of 18th Int'l Conf. on Artificial Reality and Telexistence (ICAT) 2008*, Virtual Reality Society of Japan.

Peer-Reviewed Conference Papers

C1 **de Barros, P.G.**, Rolleston, R.J., Lindeman, R.W. "Evaluation of Multi-Touch Techniques for Physically Simulated Virtual Object Manipulations in 3D Space," To appear in *Proc. of the 6th IASTED Int'l Conf. on Human-Computer Interaction (HCI2011)*, 2011.

C2 **Wang, J.**, Lindeman, R.W. "Isometric versus Elastic Surfboard Interfaces for Locomotion in Virtual Reality," To appear in *Proc. of the 6th IASTED Int'l Conf. on Human-Computer Interaction (HCI2011)*, 2011.

C3 **de Barros, P.G.**, Lindeman, R.W., Ward, M.O. "Enhancing Robot Teleoperator Situation Awareness and Performance using Vibro-tactile and Graphical Feedback," *Proc. of the IEEE 3DUI 2011*.

C4 Lindeman, R.W., Beckhaus, S. "Crafting Memorable VR Experiences using Experiential Fidelity," *Proc. of the ACM Symp. on Virtual Reality Software and Technology (VRST) 2009*, pp. 187-190.

C5 **Lima, J.P.**, Teichrieb, V., Kelner, J., Lindeman, R.W. "Standalone Edge-Based Markerless Tracking of Fully 3-Dimensional Objects for Handheld Augmented Reality," *Proc. of the ACM Symp. on Virtual Reality Software and Technology (VRST) 2009*, pp. 139-142.

C6 **Niwa, M.**, Lindeman, R.W., Itoh, Y., Kishino, F. "Determining Appropriate Parameters to Elicit Linear and Circular Apparent Motion Using Vibrotactile Cues," *Proc. of 3rd Joint EuroHaptics Conf. and Symp. on Haptic Interfaces for Virtual Environment And Teleoperator Systems (WorldHaptics)*, 2009, pp. 75-78.

C7 Lindeman, R.W., Noma, H., **de Barros, P.G.** "An Empirical Study of Hear-Through Augmented Reality: Using Bone Conduction to Deliver Spatialized Audio," *Proc. of IEEE Virtual Reality*, 2008, pp. 35-42.

C8 **Hamazaki, H.**, **Kitaoka, S.**, **Ozaki, M.**, Kitamura, Y., Lindeman, R.W., Kishino, F. "Extracting Camera-Control Requirements and Camera Movement Generation in a Three-Dimensional Virtual Environment," *Proc. of the Int'l Conf. on Advances in Computer Entertainment Technology (ACE)*, 2008, pp. 126-129.

C9 Lindeman, R.W., Noma, H. "A Classification Scheme for Multi-Sensory Augmented Reality," *Proc. of ACM Virtual Reality Software and Technology (VRST)*, 2007, pp. 175-178.

C10 Lindeman, R.W., Noma, H., **de Barros, P.G.** "Hear-Through and Mic-Through Augmented Reality: Using Bone Conduction to Display Spatialized Audio," *Proc. of the Int'l Symp. on Mixed and Augmented Reality (ISMAR)*, 2007, pp. 173-176.

C11 **Razzaq, L.**, Heffernan, N.T., Lindeman, R.W. "What Level of Tutor Interaction is Best?" In Luckin & Koedinger (editors) *Proc. of the 13th Conf. on Artificial Intelligence in Education*. IOS Press, 2007. pp. 222-229.

C12 Lindeman, R.W., Yanagida, Y., Hosaka, K., Abe, S. "The TactaPack: A Wireless Sensor/Actuator Package for Physical Therapy Applications," *Proc. of the 14th Symp. on Haptic Interfaces for Virtual Env. and Teleoperator Systems*, 2006, pp. 337-341.

C13 **Kohli, L.**, **Niwa, M.**, Noma, H., Susami, K., Yanagida, Y., Lindeman, R.W., Hosaka, K., Kume, Y. "Towards Effective Information Display Using Vibrotactile Apparent Motion," *Proc. of the 14th Symp. on Haptic Interfaces for Virtual Env. and Teleoperator Systems*, 2006, pp. 445-451.

C14 Noma, H., **Hashida, Y.**, Lindeman, R.W. Susami, K., Hosaka, K., Kume, Y. "A Study of Mounting Methods for Tactors Using an Elastic Polymer," *Proc. of the 14th Symp. on Haptic Interfaces for Virtual Env. and Teleoperator Systems*, 2006, pp. 343-345.

C15 **Niwa, M.**, Noma, H., Yanagida, Y., Hosaka, K., Lindeman, R.W. "Controlling the Perceived Vibrational Frequency and Amplitude of a Voice-Coil-Type Tactor," *Proc. of the 14th Symp. on Haptic Interfaces for Virtual Env. and Teleoperator Systems*, 2006, pp. 55-56.

C16 Sibert, J., **Cooper, J.**, **Covington, C.**, **Stefanovski, A.**, **Thompson, D.**, Lindeman, R.W. "Vibrotactile Feedback for Enhanced Control of Urban Search and Rescue Robots," *Proc. of the IEEE Symp. on Safety, Security and Rescue Robots*, Gaithersburg MD, August 22-24, 2006 (4 pages, no page numbers).

C17 Lindeman, R.W., Page, R., Sibert, J.L., Templeman, J.N. "Using Vibrotactile Cues for Virtual Contact and Data Display in Tandem," *Proc. of the 11th Int'l Conf. on Human-Computer Interaction (HCII)*, 2005, published on CD-ROM (9 pages, no page numbers).

C18 **Gievska, S.**, Lindeman, R., Sibert, J. "Examining the Qualitative Gains of Mediating Human Interruptions During HCI," *Proc. of the 11th Int'l Conf. on Human-Computer Interaction (HCII)*, 2005, published on CD-ROM (10 pages, no page numbers).

C19 Lindeman, R.W., Sibert, J.L., **Mendez-Mendez, E.**, **Patil, S.**, **Phifer, D.** "Effectiveness of Directional Vibrotactile Cuing on a Building-Clearing Task," *Proc. of ACM Human Factors in Computing Systems (CHI)*, 2005, pp. 271-280.

C20 **Mendez, E.**, Yoshida, S., Noma, H., Lindeman, R.W., Yanagida, Y., Masaki, S., Hosaka, K. "A Haptic-Assisted Guidance System for Navigating Volumetric Data Sets," *WorldHaptics - First Joint Eurohaptics Conf. and Symp. on Haptic Interfaces for Virtual Environment and Teleoperator Systems*, 2005, pp. 531-534.

C21 Lindeman, R.W., Page, R., Yanagida, Y., Sibert, J.L., "Towards Full-Body Haptic Feedback: The Design and Deployment of a Spatialized Vibrotactile Feedback System," *Proc. of ACM Virtual Reality Software and Technology (VRST)*, 2004, pp. 56-59.

C22 Lindeman, R.W., Sibert, J.L., Lathan, C.E., Vice, J.M., "The Design and Deployment of a Wearable Vibrotactile Feedback System," *Proc. of the 8th IEEE Int'l Symp. on Wearable Computers (ISWC)*, 2004, pp. 56-59.

C23 **Rosen, N.**, **Sattar, R.**, Lindeman, R.W., Simha, R., Narahari, B., "HomeOS: Context-Aware Home Connectivity," *Proc. of the 2004 Int'l Conf. on Pervasive Computing and Communications (PCC)*, pp. 739-744.

C24 Yanagida, Y., **Kakita, M.**, Lindeman, R.W., Kume, Y., Tetsutani, N., "Vibrotactile Letter Reading Using a Low-Resolution Tactor Array," *Proc. of the 12th Symp. on Haptic Interfaces for Virtual Environment and Teleoperator Systems*, 2004, pp. 400-406.

C25 Lindeman, R.W., "Virtual Contact: The Continuum from Purely Visual to Purely Physical," *Proc. of the 47th Annual Meeting of the Human Factors and Ergonomics Society (HFES)*, 2003, pp. 2103-2107.

C26 Lindeman R.W., Yanagida, Y., Sibert, J.L., Lavine, R. "Effective Vibrotactile Cueing in a Visual Search Task," *Proc. of the Ninth IFIP TC13 Int'l **Conf.** on Human-Computer Interaction (INTERACT)*, 2003, pp. 89-96.

C27 Lindeman, R.W., **Cutler, J.R.** "Controller Design for a Wearable, Near-Field Haptic Display," *Proc. of the 11th Symp. on Haptic Interfaces for Virtual Environment and Teleoperator Systems*, 2003, pp. 397-403.

C28 **Hernandez-Rebollar, J.L.**, Lindeman, R.W., Kyriakopoulos, N. "A Multi-Class Pattern Recognition System for Practical Finger Spelling Translation," *Proc. of the 4th IEEE Int'l Conf. on Multimodal Interfaces (ICMI)*, 2002, pp. 185-190.

C29 Lindeman, R.W. Templeman, J.N. "Vibrotactile feedback for handling virtual contact in immersive virtual environments," *Usability Evaluation and Interface Design: Cognitive Engineering, Intelligent Agents and Virtual Reality*, In Smith, M.J., Salvendy, G., Harris, D., and Koubek, R.J. (editors), 2001, pp. 21-25.

C30 Lindeman, R.W., Sibert, J.L., Templeman, J.N. "The Effect of 3D Widget Representation and Simulated Surface Constraints on Interaction in Virtual Environments," *Proc. of IEEE Virtual Reality*, 2001, pp. 141-148.

C31 **Lindeman, R.**, Sibert, J., Hahn, J. "Towards Usable VR: An Empirical Study of User Interfaces for Immersive Virtual Environments," *Proc. of ACM Human Factors in Computing Systems (CHI)*, 1999, pp. 64-71.

C32 Lindeman, R., Sibert, J., Hahn, J. "Hand-Held Windows: Towards Effective 2D Interaction in Immersive Virtual Environments," *Proc. of IEEE Virtual Reality*, 1999, pp. 205-212.

C33 **Voss, G.**, Hahn, J., Müller, W., Lindeman, R. "Virtual Cutting of Anatomical Structures," *Proc. of Medicine Meets VR*, 1999, IOS Press.

C34 Hahn, J.K., Kaufman, R., Winick, A.B., **Carleton, T.**, **Park, Y.**, Lindeman, R., Oh, K.M., **Al-Ghreimil, N.**, Walsh, R.J., Loew, M., **Sankar, S.** "Training environment for inferior vena caval filter placement," In J. D. Westwood, H. M. Hoffman, S. J. Weghorst, and D. Stredney (eds.), *Medicine Meets Virtual Reality (MMVR) 1998, Studies in Health Technology and Informatics*, volume 50, pp. 291-297, Amsterdam, 1998. IOS Press.

Peer-Reviewed Poster/Sketch/Work-in-Progress Papers

P1 **Wang, J.**, Lindeman, R.W. "Silver Surfer: A System to Compare Isometric and Elastic Board Interfaces for Locomotion in VR," (Poster) *Proc. of the IEEE 3DUI 2011*.

P2 **Ohnishi, T.**, Lindeman, R.W. Kiyokawa, K. "Multiple Multi-Touch Touchpads for 3D Selection," *Proc. of the IEEE 3DUI 2011*.

P3 **de Barros, P.G.**, Lindeman, R.W., **Loughlin, T.J.** "Head Movement Evaluation for First-Person Games," Work-In-Progress Report, ACM Human Factors in Computing Systems (CHI), 2009.

P4 **de Barros, P.G.**, Lindeman, R.W., **Loughlin, T.J.** "Characterizing Head Movement in First Person Games," ACM SIGGRAPH Symp. on Interactive 3D Graphics and Games, 2009. (**Best Poster Award)**

P5 de Barros, P.G., Lindeman, R.W., Ward, M. "Evaluation of Tactile Feedback for Teleoperated Robots," ACM SIGGRAPH Symp. on Interactive 3D Graphics and Games, 2009.

P6 **Hamazaki, H.**, **Kitaoka, S.**, **Ozaki, M.**, Kitamura, Y., Lindeman, R.W., Kishino, F. "Collision Free Chase Camera Movement in a 3D Virtual Environment," ACM SIGGRAPH Symp. on Interactive 3D Graphics and Games, 2009.

P7 **Orman, N.**, Kim, H., Sakamoto, R.,Toriyama, T., Kogure, K., Lindeman, R. "GPU Optimization of a Free-Viewpoint Video System," ACM SIGGRAPH Symp. on Interactive 3D Graphics and Games, 2008. (**2nd Place, Best Student Poster Award)**

P8 **Cohen, J.**, **Niwa, M.**, Lindeman, R.W., Noma, H., Yanagida, Y., Hosaka, K. "A Closed-Loop Tactor Frequency Control System for Vibrotactile Feedback," *Extended Abstracts, ACM Human Factors in Computing Systems (CHI)*, 2005, pp. 1296-1299.

P9 Lindeman, R.W., Yanagida, Y., Noma, H., Hosaka, K., Kuwabara, K. "Design of a Wireless Tactor System for Haptic Feedback in Virtual Reality," *Proc. of IEEE Virtual Reality*, 2005, pp. 285-286.

P10 Hernandez-Rebollar, J.L., Kyriakopoulos, N., Lindeman, R.W. "A New Instrumented Approach For Translating American Sign Language Into Sound And Text," *Proc. of 6th IEEE Int'l Conf. on Automatic Face and Gesture Recognition (FG'04)*, pp. 547-552.

P11 Lindeman, R.W., Yanagida, Y. "Empirical Studies for Effective Near-Field Haptics in Virtual Environments," *Proc. of IEEE Virtual Reality*, 2003, pp. 287-288.

P12 **Hernandez-Rebollar, J.L.**, Kyriakopoulos, N., Lindeman, R.W. "The AcceleGlove: A Whole-Hand Input Device for Virtual Reality," *Conf. Abstracts and Applications, ACM SIGGRAPH*, 2002, p. 259.

P13 Yamashita, J., Lindeman, R., Fukui, Y., Morikawa, O., Sato, S. "On Determining the Haptic Smoothness of Force Shaded-Surfaces," *Conf. Abstracts and Applications, ACM SIGGRAPH*, 2000, p. 240.

P14 Yamashita, J., Lindeman, R., Fukui, Y., Morikawa, O., Yi, C. "Plane-Shape Perception Using Point-Contact Type Force Feedback Device," *Conf. Abstracts and Applications, ACM SIGGRAPH*, 1998, p. 274.

P15 **Park, Y.**, Lindeman, R., Hahn, J. "X-Ray Casting: Fast Volume Visualization Using 2D Texture Mapping Techniques," *ACM Visualization, Late Breaking Hot Topics*, 1996.

Peer-Reviewed Workshop Paper

W1 **Chang, C.-H.**, **Lohrmann, P.**, Agu, E., Lindeman, R. "ENCORE: Energy-Conscious Rendering for Mobile Devices," *First Workshop on General Purpose Processing on Graphics Processing Units*, Oct., 2007, Boston, MA, USA.

Television Segment

V1 "The TactaVest," Discovery Channel/Daily Planet, Airdate: May 26, 2006. [http://web.cs.wpi.edu/~gogo/hive/movies/TactaVest_DailyPlanet.mov] (71MB)

Book Chapter

R1 Beckhaus, S., Lindeman, RW. "Experiential Fidelity: Leveraging the Mind to Improve the VR Experience," book chapter for *Virtual Realities*.

Awarded Grants, Gifts, and Fellowships

G1 **Student Panel at IEEE Virtual Reality 2009.** NSF, $6,149, Apr. 2009-Mar. 2010.

G2 **A GK-12 Partnership Implementing Mathematics and Science Education (PIMSE): Assisting Middle School use of Technology in the Classroom.** My role is as "Senior Personnel." PIs: N. Heffernan, J. Gobert, E. Rundensteiner, G. Heineman, NSF, $2,090,721, May 2008-May 2012.

G3 **Enhanced Sensor-Assisted Perception.** Co-PI: BBN Technologies, ONR, PI Award: $83,635. Overall award: $750,000, Jan. 2008-Sep. 2008.

G4 **Fit Gaming.** Research Fellowship. Japan Society for the Promotion of Science Fellowship, Osaka University, Osaka, Japan, Summer 2008.

G5 **Climate Connections Challenge: Serious Game Proposal.** Co-PI: D. Finkel. Joint with US-FIRST. Dept. of Homeland Security. WPI award: $22,500. Total award: $40,000. Feb. 2008-Aug. 2009.

G6 **Student Panel at IEEE Virtual Reality 2008.** NSF, $5,708, Mar. 2008-Feb. 2009.

G7 **The Virtutopia Server Framework: Massive Multi-player Online Simulation Server Framework.** Gift. QNX Software Systems, $86,950, Jun. 2006.

G8 **Vibrotactile Feedback for Enhanced Control of Mobile Robots.** Co-PI: J. Sibert. NIST, $120,000, Jun. 2005-May 2006.

G9 **Haptic Rendering of Virtual Stimuli for Fully Immersive Virtual Reality Training Systems**. Co-PI: J. Sibert. ONR-STTR Phase I (with AnthroTronix, Inc), $70,000, Jul. 2003-Apr. 2004.

G10 **The TactaVest: Haptic Stimulation Garment for Virtual Environments**. Co-PI: J. Sibert. ONR, $20,000, Apr.-Oct. 2003.

G11 **Home of the 21st Century: The HomeOS Event-Based Operating System for the Home.** Co-PIs: R. Simha, B. Narahari. America Online, $110,000, Sep. 2003-Aug. 2004.

G12 **Home of the 21st Century: Context Following in the Home Environment.** Co-PIs: R. Simha, B. Narahari. America Online, $120,000, Sep. 2003-Aug. 2004.

G13 **MRI: Research Infrastructure for Distributed Sensor Applications in the Home of the Future**. Co-PIs: R. Simha, B. Narahari, S. Rotenstreich, Z. Guo, C. Korman, B. Myklebust, J. Philbeck. NSF, $140,000, Jun. 2002-Jul. 2005.

G14 **Home of the 21st Century: Audio Streams Management in the Home**. Co-PIs: R. Simha, B. Narahari. America Online, $129,000, Sep. 2002-Aug. 2003.

G15 **Development of a Navigation Aid for use in Real and Virtual Environments**. Co-PI: J. Philbeck. Dilthey Fellowship, The George Washington University, $15,162, Jul. 2002-Aug. 2002.
G16 **Vibrotactile Feedback as a Human Computer Interaction Modality in a Mobile Distributed Computing Environment**. Co-PIs: J.Sibert, R. Simha. DARPA, $250,000, Jun. 2001-May 2002.
G17 **Electronic Commerce**. Co-PIs: B. Narahari, R. Simha. NSF, $150,000, Jan. 2001-Dec. 2002.
G18 **Home of the 21st Century: Remote Management of Devices in the Home.** Co-PI: S. Rotenstreich. America Online, $90,000, Jan. 2001-Dec. 2001.
G19 **Internet-Based Research to Expand Analysts' Metacognition, Critical Thinking, and Collaboration Skills.** Co-PIs: R. Heller, J. Sibert. LUCITE (NSA consortium), $133,946, Nov. 2000-Mar. 2002.
G20 **Handling Virtual Contact in Immersive Virtual Environment Simulations**. ONR, $77,347, Oct. 2000-Sep. 2003.
G21 **Teaching People to Visualize Data**. Co-PI: R. Heller. LUCITE (NSA consortium), $50,000, Jan. 2000-Jun. 2000.
G22 **Summer Institute in Japan**, Principal Investigator, NSF, Japanese National Institute of Bioscience and Human-Technology (AIST), Tsukuba, Japan, Summer 1997.
G23 **Sponsored Researcher**, The Laboratory for Advanced Computer Applications in Medicine, The George Washington University, Jul. 1996-Jun. 1998.
G24 **Supported Researcher**, Interactive Multimedia, NSF, Sep. 1993-Dec. 1994.

Professional Presentations

The following list contains seminar talks and workshop talks without corresponding publications. I also gave the conference presentations associated with conference publications.

PP1 It's All in my Head: Leveraging the Mind to Improve the VR Experience,
Keynote address, 11th Symposium on Virtual and Augmented Reality, Porto Alegre, Brazil, May 2009.
PP2 Interactive Media & Game Development at WPI: Intro to Game Development, Osaka University,
Osaka, Japan, July 2008.
PP3 Endowed Virtual Objects: Hyper-Realistic Object Properties for Virtual Environments,
Dagstuhl Seminar on Virtual Realities (Invitation-Only Meeting), Dagstuhl, Germany, June 2008.
PP4 Classifying 3D Interaction Techniques and Devices for Gaming and Virtual Environments,
Brown University, April 2006.
PP5 Classifying 3D Interaction Techniques and Devices for Gaming and Virtual Environments,
Tufts University, March 2006.
PP6 See, Hear, Smell, Touch, Taste: Multi-Modal Interaction in Virtual Environments,
San Francisco State University, March 2005.
PP7 See, Hear, Smell, Touch, Taste: Multi-Modal Interaction in Virtual Environments,
University of Hawai'i, March 2005.
PP8 See, Hear, Smell, Touch, Taste: Multi-Modal Interaction in Virtual Environments,
Harvey Mudd College, February 2005.
PP9 See, Hear, Smell, Touch, Taste: Multi-Modal Interaction in Virtual Environments,
Lafayette College, December 2004.

WPI Research Group Membership

1. Human Interaction in Virtual Environments (HIVE)[1], Director
   - Topics: Virtual Reality; 3D user interaction; Video games
   - Participants: Three faculty, five graduate students, three undergraduate students
   - Frequency: Weekly
   - Format: Paper discussions

[1] http://www.cs.wpi.edu/~hive/

2. Image Science Research Group (ISRG)[2]
    - Topics: Data visualization; Computer graphics; Medical imaging
    - Participants: Four faculty, nine graduate students
    - Frequency: Bi-weekly
    - Format: Paper discussion
3. Mobile Graphics Research Group (MGRG)[3]
    - Topics: GPU programming; Rendering on mobile devices; Wireless media streaming
    - Participants: Two faculty, four graduate students
    - Frequency: Bi-weekly
    - Format: Member presentations

Professional Society Memberships and Offices

1. Senior Member of the ACM (Association for Computing Machinery)
2. Senior Member of the IEEE
3. Member of Upsilon Pi Epsilon, Int'l Honor Society for the Computing and Information Disciplines.

Reviewing and Refereeing

1. IEEE Computer Graphics & Applications (Journal)
2. Presence: Teleoperators and Virtual Environments (Journal)
3. IEEE Transactions on Visualization and Computer Graphics (Journal)
4. IEEE Transactions on Haptics (Journal)
5. Computers & Education (Journal)
6. IEEE Virtual Reality (Conference)
7. ACM SIGGRAPH Emerging Technologies (Conference)
8. IEEE Symposium on 3D User Interaction (Conference)
9. ACM Virtual Reality Software and Technology (Conference)
10. ACM Conference on Human Factors in Computing Systems (CHI, conference)
11. EuroGraphics Virtual Environments (Conference)
12. HCI-International (Conference)
13. Int'l Conf. on Artificial Reality and Telexistence (ICAT, Conference)
14. IASTED HCI 2003-2005 (Conference)
15. Int'l Symp. on Mixed & Augmented Reality (ISMAR, Conference)

Honors, Awards, and Other Recognition Related to Scholarship

1. 1998-1999 Departmental Fellow, Dept. of EE & CS, The George Washington University.
2. 1995-1996 Departmental Fellow, Dept. of EE & CS, The George Washington University.

Service

Professional

1. **Conference Co-chair**, IEEE Virtual Reality 2011
2. **Conference Chair**, IEEE Virtual Reality 2010
3. **Program Chair**, IEEE Virtual Reality 2009
4. Panels Chair, IEEE Virtual Reality 2008
5. Research Demos Chair, IEEE Virtual Reality 2007
6. Local Arrangements Chair, IEEE Virtual Reality 2006
7. Panels Chair, IEEE Virtual Reality 2005
8. Student Volunteers Chair, IEEE Virtual Reality 2004
9. Videos Chair, IEEE Virtual Reality 2003 & 2004
10. **Program Chair**, Int'l Conf. on Artificial Reality and Tele-existence (ICAT) 2008

[2] http://web.cs.wpi.edu/Research/isrg/
[3] http://web.cs.wpi.edu/Research/mgrg/

11. Program Committee Member, ACM Virtual Reality Software & Tech. (VRST) Conf. 2007
12. Events Chair, Washington, DC, Chapter of ACM SIGGRAPH 1995-2000

Program, Department, and University

IMGD Program Service

1. 2009-2011 Chair, IMGD Graduate Committee
   - Was one of the main architects of the MS degree program launching in Fall 2011
   - Helped design the curriculum for the program
   - Defined and implemented admission criteria for the program
   - Outlined a marketing plan for bringing students into the program
2. 2006-2010 Organized the weekly "IMGD Speaker Series"
   - Arranged over 60 industry and academic speakers to come to WPI to talk about game development
   - Helped build a sense of community within IMGD, and with local game industry
3. 2005-Pres. IMGD Steering Committee member
   - Met weekly for the past four+ years to shape the IMGD program
   - Helped institute curricular changes to the program
   - Identified faculty hiring needs
   - Worked on student attraction and retention issues
4. 2008-2009 Faculty Organizer, WPI 38-Hour GameJam
   - Over 60 student participants
   - Significantly increased IMGD program visibility outside of WPI
   - Significant face-to-face involvement by local game industry people
   - WPI student teams placed in top three in the 2008 and 2009 competitions

CS Department Service

1. 2008-Present Technical Reports Committee, Dept of CS, WPI
2. 2006-2008 Education Committee, Dept. of CS, WPI
3. 2006-2008 Faculty Advisor, ACM Student Chapter, WPI
4. 2005-2006 Facilities Committee, Dept. of CS, WPI
5. 1999-2005 Chair, Student Relations Committee, Dept. of CS, GWU

University Service

1. 2010-2011 Faculty Review Committee, WPI
2. 2006-2007 Chair, judging panel, President's IQP Award, WPI
3. 2005-2006 Member, judging panel, President's IQP Award, WPI
4. 2002-2004 Engineering School Rep. on the Univ. Honors Program Advisory Committee, GWU