

# Benjamin C. Lok

*Curriculum Vitae – December 14, 2011*

## CONTACT

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## EMPLOYMENT

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(August 2009 – present) **Associate Professor** with tenure – Department of Computer and Information Science and Engineering, *University of Florida*  
(August 2003 – August 2009) **Assistant Professor** – *University of Florida*.

(August 2010 – present) **Chair of the Scientific Advisory Board**, *Shadow Learning, Inc.*, Gainesville, FL

(June 2006 – present) **Adjunct Associate Professor**– Department of Surgery, *Georgia Health Sciences University*

(August 2002 – July 2003) **Post Doctoral Research Fellow** – *University of North Carolina at Charlotte*, Advisor: Professor Larry F. Hodges

## EDUCATION

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*University of North Carolina at Chapel Hill*

**Ph.D. in Computer Science** (May 2002), Advisor: Professor Frederick P. Brooks, Jr.

*Dissertation: Interacting with Dynamic Real Objects in Virtual Environments*

**M.S. in Computer Science** (May 1999), Advisor: Professor Gary Bishop

*University of Tulsa*

**B.S. in Computer Science** (*magna cum laude*), Minor in Mathematics (May 1997), Advisor: Professor Sujeet Sheno

## HONORS

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Keynote Speaker at 8<sup>th</sup> International Symposium on Visual Computing, Las Vegas, NV (2011)

Steering Committee: IEEE Virtual Reality Conference (2009-present)

General Chair: IEEE Virtual Reality 2013

Program Chair: IEEE Virtual Reality 2011, IEEE Virtual Reality 2010, ACM VRST 2009, IEEE/ACM ISMAR 2009 (Area Co-Chair)

Speaker at the National Academy of Science Kavli France-US Frontiers of Science Symposium in Roscoff, France (2008)

IEEE Virtual Reality 2008 Best Paper

NSF Career Award (2007)

University of Florida Student ACM Chapter's CISE Teacher of the Year (2005)

ACM SIGGRAPH Symposium on Interactive 3D Graphics 2003 Top 3 Paper (2003)

Link Foundation Fellowship in Advanced Simulation and Training (2001)

National Science Foundation Fellowship (1997)

Barry M. Goldwater Scholarship (1995)

## MENTORING

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PhD students (*Joon Hao Chuah, Shivashankar Halan, Diego Rivera-Gutierrez, Andrew Robb, Michael Borish, Andrew Corda*)

MS students (*Vaishnavi Krishnan, Doaa El-Sheik, Guangyun Hu, Yashit Bash*)

Post-doctoral fellow (*Dr. Regis Kopper*)

Visiting students (*Xiaoning Li*)

### Post-Doctoral Fellows Alumni

2011, *Aaron Kotranza*

2010, *Yong Ho Hwang*

2008, *Andrew Rajj*

### Ph.D. Alumni

2011, *Dr. Brent Rossen* (Software Development Engineer In Team, Microsoft)  
 2009, *Dr. Aaron Kotranza* (Chief Technology Officer, Shadow Learning, Inc.)  
 2009, *Dr. John Quarles* (Assistant Professor, University of Texas at San Antonio), LINK Fellow  
 2008, *Dr. Andrew Rajj* (Assistant Professor, University of South Florida)  
 2008, *Dr. Kyle Johnsen* (Assistant Professor, University of Georgia), HMMI Grad Student Mentor Award

### **M.S. Alumni**

2011, *Mallory McManamon* (Amazon)  
 2010, *Shivashankar Halan* (PhD program, University of Florida)  
 2009, *Ethan Blackwelder*  
 2009, *Lu Cao* (MFA program, University of Florida)  
 2005, *Cyrus Harrison* (Lawrence Livermore Research Labs)  
 2005, *George Mora* (Industry)

### **B.S. Alumni**

2009, *Willie Maddox*  
 2008, *Harold Rodriguez* (GrooveShark.com)  
 2008, *Corey Forbus* (Industry)  
 2007, *Joshua Horton* (Ph.D. program, University of Florida)  
 2006, *Robert Dickerson* (Ph.D. program, Virginia Tech)  
 2005, *Aaron Kotranza* (Ph.D. program, University of Florida)  
 2005, *Sayed Hashimi* (Industry)  
 2005, *Art Homs* (Industry)  
 2005, *Andrew Joubert* (Industry)  
 2005, *Sam Preston* (Advanced Engineering Center at Old Dominion University)

## **FUNDING**

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**Extramural Grants (Total: \$5,577,321. PI: \$3,124,410, Co-PI: \$2,078,103, Consultant: \$1,195,650)**

**Internal Grants (\$18,380)**

### **Current**

#### **PI of Grant**

**NIH, R01 Grant, (1R01LM010813-01) (PI, 2<sup>nd</sup> PI: Cendan, Co-Is: Lind, Johnsen, Cuty-Ruiz)**  
*Neurological Exams Teaching & Evaluation Using Virtual Patients*  
 09/01/2010 – 08/31/2015, Total: \$1,833,293

**NSF, Medium Grant, (IIS- 0803652) (PI, Co-PIs: Lind, Ferdig)**  
*HCC-Medium: Mixed Reality Virtual Humans for Training*  
 9/1/2008 – 8/31/2012, Total: \$580,000

**NSF, Career Award, (IIS-0643557) (PI)**  
*Studying Diversity Issues with Immersive Virtual Humans*  
 8/1/2007 – 7/31/2012, \$405,695

**NSF, Research Experience for Undergraduates, (IIS-0733800) (PI)**  
*Studying Diversity Issues with Immersive Virtual Humans*  
 8/1/2007 – 7/31/2010, \$12,000

#### **Co-PI or Consultant of Grant**

**USHHS, SAMSHA, (Co-PI, PI: McCance-Katz AAAP)**  
 7/1/2011 – 6/3/2014, \$500,000 (UF: \$216,260)

**NIH, R21 Grant, (Co-I, PI: Quarles)**  
*A Mixed Reality Conscious Sedation Simulator for Learning to Manage Variability*  
 4/1/2011 - 3/31/2012, \$369,473

**NIH, R01 Grant, (Co-I, PI: Robinson)**  
*Pain Treatment Decisions: Influence of Sex, Race, and Age*  
 9/1/2009 – 8/31/12, Total: \$1,095,473, NIH Score: 121 (top 1.9%)

**New Zealand Tertiary Education Commission, (Partner, PI: Billingham)**  
*Immersive Learning Through Virtual Reality*  
 1/1/2009 – 12/31/2011, Total: \$1,117,650 (funded students and travel to NZ)

### Completed

**RORC, Pilot Grant, (Co-I, PI: Levy)**  
*Development of Virtual Humans for PTSD and mTBI*  
 9/1/2010 – 8/31/2011, \$38,443

**NIH, R03 Grant, (R03LM009646-01) (PI, 2<sup>nd</sup> PI: Cendan)**  
*Immersive Virtual Patients with Abnormal Clinical Conditions for Medical Student Training*  
 8/15/2008 – 8/14/2010, Total: \$137,014  
 Administrative Grant Award (9/29/2009-9/30/2010), Total: \$36,625

**NIH, R56 Grant, (Co-I, PI: Robinson)**  
*Pain Treatment Decisions: Influence of Sex, Race, and Age*  
 9/1/2008 – 8/31/09, Total: \$323,454

**Association of Surgical Education, CESERT Grant, (Consultant, PI: Lind)**  
*The Use of a Virtual Character-Enhanced Simulator to Teach and Assess Breast History and Examination Skills*  
 7/1/2008 – 6/30/2010, Total: \$78,000

**Drager Medical Contract (Co-PI, PI: Lampotang)**  
*Mixed Reality Simulation for Anesthesia Machine Training*  
 10/1/2008 – 9/30/2009, Total: \$35,000

**Medical College of Georgia Contract (PI)**  
*Virtual Humans to Teach Medical Communication Skills*  
 3/1/2007 – 5/31/2008, \$59,000

**Keele University Contract (PI)**  
*Virtual Humans to Teach Pharmacy Communication Skills*  
 4/1/2007 – 6/30/2007, \$56,000

**NSF CCF-0713983 (PI)**  
*CPA (Gr&Vis): Student Panel at IEEE Virtual Reality 2007 Conference*  
 3/1/2007 – 4/1/2007, \$4725

### **Internal Grants (\$18,380)**

**2005 College of Public Health and Health Professions Contract**  
*Contract from Professor Michael Robinson on Virtual Humans for Pain Studies*  
 2005, \$3,240

**2004 College of Medicine Education Center Grant (Co-PI, PI: Stevens, Lind)**  
*A Pilot Study to Examine the Use of Virtual Patient and Instructor in Teaching Medical Students Communication Skills using an Abdominal pain Scenario*  
 6/1/2004-12/31/2004, \$4,900

**2004 Professor Sumi Helal Contract**  
*Distance Dining*  
 2004, \$10,240

### **PUBLICATIONS**

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\* - student supervised

AR – Acceptance Rate reported when known

#### **Peer-Reviewed Journal Articles**

1. Cendan, J., and Lok, B. "The use of virtual patients in medical school curricula." *Advances in Physiology Education* (Accepted).

2. Rossen, B. and Lok, B. "A Crowdsourcing Method to Develop Virtual Human Conversational Agents." *International Journal of Human-Computer Studies*. (accepted)
3. Lin, C., Laserna, C., Lind, D., Kalaria, C., Aryal, T., Lok, B., Johnsen, K., Kotranza, A., Cendan, J., and Pruitt, J. "User response to the simulation of a virtual patient with cranial nerve injury", *Journal of Bio-Algorithms & Med-Systems*, Volume 8, No. 1, March 2012. (accepted)
4. *IEEE Transactions on Visualization and Computer Graphics*, Editors Interrante, V. **Lok, B.**, and Majumder, A.
5. Ezzell, Z., Fishwick, P. Lok, B., Pitkin, A., Lampotang, S. "An ontology-enabled user interface for simulation model construction and visualization" *Journal of Simulation* 5(3): 147-156.
6. *IEEE Transactions on Visualization and Computer Graphics*, Editors Kiyokawa, K., Klinker, G., and **Lok, B.** Volume 17, No. 9, ISSN 1077-2626.
7. Kotranza, A., Lind, D., and **Lok, B.** "Real-time Evaluation and Visualization of Learner Performance in a Mixed Reality Environment for Clinical Breast Examination," *IEEE Transactions on Visualization and Computer Graphics*. Accepted 6/28/2011.
8. *IEEE Transactions on Visualization and Computer Graphics*, Editors Thalmann, D. and **Lok, B.** Volume 17, No. 7, July 2011, ISSN 1077-2626.
9. Wendling, A., Halan, S.\*, Tighe, P., Le, L., Euliano, T., and Lok, B. "Virtual humans versus standardized patients in presenting abnormal physical findings", *Academic Medicine*. 2011; 86(3): 384-388. (Impact Factor: 1.940, ranked #2 of 21 scientific journals of the AAMC).
10. Kotranza, A.\*, Cendan, J., Johnsen, K., and **B. Lok**. "Simulation of a Virtual Patient with Cranial Nerve Injury Augments Physician-Learner Concern for Patient Safety," *Journal on Bio-Algorithms and Med-Systems*, Vol. 6, No. 11, 2010, 25-34.
11. Quarles, J.\*, Lampotang, S., Fischler, I., Fishwick, P., and **B. Lok**, "A Mixed Reality Approach for Interactively Blending Dynamic Models with Corresponding Physical Phenomena" (in press) *ACM Transactions on Modeling and Computer Simulation*, Volume 20, Issue 4, October 2010.
12. Quarles, J.\*, Lampotang, S., Fischler, I., Fishwick, P., and **B. Lok**, "Scaffolded Learning with Mixed Reality" *Computers and Graphics: Special Issue on Virtual Reality*, Volume 33, Issue 1, February 2009, 34-46.
13. Kotranza, A.\*, **Lok, B.**, Deladisma, A., Pugh, C.M., and D. S. Lind, "Mixed Reality Humans: Evaluating Behavior, Usability, and Acceptability," (accepted) *IEEE Transactions on Visualization and Computer Graphics*. July/August 2009.
14. Deladisma, A., Gupta, M., Kotranza, A., Bittner, B., Imam, T., Swinson, D., Gucwa, A., Nesbit, R., **Lok, B.**, Pugh, C., and D. Lind (2008). "A Pilot Study to Integrate an Immersive Virtual Patient with a Breast Complaint and Breast Exam Simulator into a Surgery Clerkship", (accepted) *American Journal of Surgery*.
15. Ferdig, R., Coutts, J., DiPietro, J., **Lok, B.**, and Davis, N (2007). "Innovative Technologies for Multicultural Education Needs", *Multicultural Education and Technology Journal*, 1(1), 47-63.
16. Raij, A.\*, Johnsen, K.\*, Dickerson, R.\*\*, **Lok, B.**, Cohen, M., Duerson, M., Pauley, R., Stevens, A., Wagner, P., and D. Lind (2007). "Comparing Interpersonal Interactions with a Virtual Human to those with a Real Human," *IEEE Transactions on Visualization and Computer Graphics*, Vol .13, No. 3, May/June 2007, 443-457.
17. Deladisma, A., Cohen, M., Stevens, A., Wagner, P., **Lok, B.**, Bernard, T., Oxendine, C., Schumacher, L., Johnsen, K.\*, Dickerson, R.\*\*, Raij, A.\*, Wells, R.\*, Duerson, M., Harper, J., and D. Lind (2006). "Do Medical Students Respond Empathetically to a Virtual Patient?" *The American Journal of Surgery*, Vol 193, Issue 6, 2007, 756-760.
18. **Lok, B.**, Ferdig, R., Raij, A.\*, Johnsen, K.\*, Dickerson, R.\*\*, Coutts, J., Stevens, A., and D. Lind (2007) "Applying Virtual Reality in Medical Communication Education: Current Findings and Potential Teaching and Learning Benefits of Immersive Virtual Patients", *Journal of Virtual Reality*, Spring London, Vol. 10, No. 3-4, 185-195.
19. **Lok, B.** (2006). "Teaching Communication Skills with Virtual Humans" (Invited Article) *IEEE Computer Graphics and Applications*, Vol 26, No. 3, 10-13.
20. Johnsen, K.\*, Dickerson, R.\*\*, Raij, A.\*, Harrison, C.\*, **Lok, B.**, Stevens, A., and D. Lind. (2005). "Using Immersive Virtual Characters to Educate Medical Communication Skills," *Journal on Presence: Teleoperators and Virtual Environments*, Vol 15, No. 1, 33-46.
21. Stevens, A., Hernandez, J., Johnsen, K.\*, Dickerson, R.\*\*, Raij, A.\*, Harrison, C.\*, DiPietro, M., Allen, B., Ferdig, R., Foti, S., Jackson, J., Shin, M., Cendan, J., Watson, R., Duerson, M., **Lok, B.**, Cohen, M., Wagner, P., and D. Lind (2005). "The Use of Virtual Patients to Teach Medical Students Communication Skills." *The American Journal of Surgery*, Jun; 191(6):806-811.

22. Zanbaka, C., **Lok, B.**, Babu, S., Xiao, D., Ulinski, A. and L. Hodges (2005). "Path Visualizations and Cognition in Virtual Environments," *IEEE Transactions on Visualization and Computer Graphics*, 11.6: 694-705.
23. **Lok, B.** (2004). "Towards Merging Real and Virtual Spaces," *Communications of the ACM*, August 2004, 47.8: 48-53.
24. **Lok, B.**, Naik, S., Whitton, M., and F. 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*, Vol. 12, No. 6, 615-628.

#### Peer-Reviewed Conference Articles

1. Chuah, J., Robb, A., White, C., Wendling, A., Lampotang, S., Kopper, R., and Lok, B. "Increasing Agent Physicality to Raise Social Presence and Elicit Realistic Behavior" (short paper) in *Proceedings of IEEE Virtual Reality 2012*. (accepted)
2. Rivera-Gutierrez, D., Welch, G., Lincoln, P., Whitton, M., Cendan, J., Chesnutt, D., Fuchs, H., and Lok, B. Shader lamps virtual patients: the physical representation of virtual patients. To appear in *Medicine Meets Virtual Reality 19 - NextMed*, Studies in Health Technology and Informatics, IOS Press, 2012.
3. DiPietro, J., Maddox, W., Rivera-Gutierrez, D., and Lok, B. "Investigating perceptions of avatars in an interactive digital simulation," Annual Meeting of the American Educational Research Association. New Orleans, LA. (AR: 38%).
4. S Halan, B Rossen, J Cendan, B Lok, "High Score! - Motivation Strategies for User Participation in Virtual Human Development", 10th International Conference on Intelligent Virtual Agents (IVA 2010), Philadelphia, Pennsylvania, Sept. 20-22, 2010 - LNCS Proceedings, 482-488.
5. B Rossen, J Cendan, B Lok, "Using Virtual Humans to Bootstrap the Creation of Other Virtual Humans", 10th International Conference on Intelligent Virtual Agents (IVA 2010), Philadelphia, Pennsylvania, Sept. 20-22, 2010 - LNCS Proceedings, 392-398.
6. Johnsen, K., Beck, D., and Lok, B. "The Impact of a Mixed Reality Display Configuration on User Behavior with a Virtual Human.", 10th International Conference on Intelligent Virtual Agents (IVA 2010), Philadelphia, Pennsylvania, Sept. 20-22, 2010 - LNCS Proceedings, 42-48.
7. Kotranza, A., Lind, D., Pugh, C., and **B. Lok**. "Real-time In-situ Visual Feedback of Task Performance in Mixed Environments for Learning Joint Psychomotor-Cognitive Tasks." Proceedings of the 8th IEEE/ACM International Symposium on Mixed and Augmented Reality (ISMAR 2009). (AR: 20%)
8. Rossen, B., Lind, D., and **B. Lok**. "Human-centered Distributed Conversational Modeling: Efficient Modeling of Robust Virtual Human Conversations" (short paper) 9th International Conference on Intelligent Virtual Agents 2009, Amsterdam, Netherlands, Sept. 14-16, 2009.
9. Kotranza, A., Pugh, C., Lind, D., and B. **Lok**. "Virtual Humans That Touch Back: Enhancing Nonverbal Communication with Virtual Humans through Bidirectional Touch" In *Proceedings of IEEE Symposium on 3D User Interfaces 2009*. Lafayette, LA, March 14-15, 2009, pp. 23-30.
10. Kotranza, A., Lok, B., Pugh, C., and D. Lind, "Virtual Humans That Touch Back: Enhancing Nonverbal Communication with Virtual Humans through Bidirectional Touch," (short paper) In *Proceedings of IEEE Virtual Reality 2009*. Lafayette, LA, March 14-18, 2009, pp. 175-178.
11. Raij, A., Kotranza, A., Lind, D., and B. **Lok**. "Virtual Experiences for Social Perspective Taking" (short paper) *Proceedings of IEEE Virtual Reality 2009*. Lafayette, LA, March 14-18, 2009, pp. 99-102.
12. Quarles, J., Lampotang, S., Fischler, I., Fishwick, P., and **B. Lok**, "A Mixed Reality System for Enabling Collocated After Action Review" *7th IEEE and ACM International Symposium on Mixed and Augmented Reality - ISMAR 2008*, Sept 15-18, Cambridge, UK, 107-116. (AR: 23.7%)
13. Rossen, B.\*, Johnsen, K.\*, Deladisma, A., Lind, D., and **B. Lok**. "Virtual Humans Elicit Skin-Tone Bias Consistent with Real-World Skin-Tone Biases" (short paper) *Intelligent Virtual Agents 2008*, Sept. 1-3, Tokyo, JP, 237-244.
14. Rodriguez, H., **Lok, B.**, Lind, D., and D. Beck, "Audio Analysis of Human/Virtual-Human Interaction" (short paper) *Intelligent Virtual Agents 2008*, Sept. 1-3, Tokyo, JP, 154-161.
15. Quarles, J., Lampotang, S., Fischler, I., Fishwick, P., and **B. Lok**, "Tangible User Interfaces Compensate for Low Spatial Cognition" *IEEE 3D User Interfaces 2008*, March 8-9, Reno, NV, 11-18. (AR: 28.3%)
16. Kotranza, A.\*, Deladisma, A., Lind, D., Pugh, C., and **B. Lok**, "Virtual Human + Tangible Interface = Mixed Reality Human. An Initial Exploration with a Virtual Breast Exam Patient." *IEEE Virtual Reality 2008*, March 10-12, Reno, NV., 99-106. **Best Paper, IEEE Virtual Reality 2008**. (AR: 26.1%)
17. Quarles, J., Lampotang, S., Fischler, I., Fishwick, P., and **B. Lok**, "Mixed Reality Merges Abstract and Concrete Knowledge" *IEEE Virtual Reality 2008*, March 10-12, Reno, NV, 27-34. (AR: 26.1%)

18. Raij, A.\* and **B. Lok** "IPSVIZ: An After-Action Review Tool for Human-Virtual Human Experiences" *IEEE Virtual Reality 2008*, March 10-12, Reno, NV, 91-98. (AR: 26.1%)
19. Johnsen, K.\* and **B. Lok**. An Evaluation of Immersive Displays for Virtual Human Experiences. *IEEE Virtual Reality 2008*, (short paper) March 10-12, Reno, NV, 133-136. (AR: 26.1%)
20. Deladisma, A., Johnsen, K.\*, Raij, A.\*, Rossen, B.\*, Kotranza, A.\*, Kalapurakal, M., Szlam, S., Bittner, J., Sinwson, D., **Lok, B.**, and D. Lind (2008). Medical student satisfaction using a virtual patient system to learn history-taking and communication skills. *Student Health Technology Information*, 2008, 132:101-105.
21. Johnsen, K.\*, Raij, A.\*, Stevens, A., D. Lind and **B. Lok** (2007). "The Validity of a Virtual Human Experience for Interpersonal Skills Education" in *SIGCHI conference on Human Factors in Computing Systems*, ACM Press, New York, NY, 2007, 1049-1058. (AR: 25%)
22. Kotranza, A.\*, Quarels, J., Wang, X., and **B. Lok** (2006). "Mixed Reality: Are Two Hands Better Than One?" (short paper) *ACM Symposium on Virtual Reality Software and Technology (VRST) 2006*, Nov. 1-3, Limassol, Cyprus, 31-34. (AR: 52% including short papers)
23. Raij, A., Johnsen, K., Dickerson, R.\*\* , **Lok, B.**, Cohen, M., Stevens, A., Bernard, T., Oxendine, C., Wagner, P., Lind, D (2006). "Interpersonal Scenarios: Virtual  $\approx$  Real?" *IEEE Virtual Reality 2006*, 59-66. (AR: 26%)
24. Dickerson, R.\*\* , Johnsen, K.\*, Raij, A.\* , **Lok, B.**, Stevens, A., Bernard, T., and D. Lind (2006). "Virtual Patients: Assessment of Synthesized Versus Recorded Speech," *Medicine Meets Virtual Reality 14*, 114-119.
25. Wang, X., Kotranza, A.\*, Quarels, J., **Lok, B.**, and D. Allen (2005). "A Pipeline for Rapidly Incorporating Real Objects into a Mixed Environment," *4th IEEE and ACM International Symposium on Mixed and Augmented Reality*, Vienna, Austria, 170-173.
26. Wang, X., Kotranza, A.\*, Quarels, J., **Lok, B.**, and D. Allen (2005). "Rapidly Incorporating Real Objects for Evaluation of Engineering Designs in a Mixed Reality Environment," *New Directions in 3D User Interfaces Workshop, IEEE Virtual Reality 2005*, Bonn, Germany, 170-173.
27. Dickerson, R.\*\* , Johnsen, K.\*, Raij, A.\* , **Lok, B.**, Hernandez, J., Stevens, A., and D. Lind. (2005). "Evaluating a Script-Based Approach to Simulating Patient-Doctor Interaction," *SCS 2005 International Conference on Human-Computer Interface Advances for Modeling and Simulating (SIMCHI '05)*, 79-84.
28. Johnsen, K.\*, Dickerson, R.\*\* , Raij, A.\* , **Lok, B.**, Jackson, J., Shin, M., Hernandez, J., Stevens, A., and D. Lind. "Experiences in Using Immersive Virtual Characters to Educate Medical Communication Skills," *IEEE Virtual Reality 2005*, Bonn, Germany, March 2005, 179-186. (AR: 26%)
29. Whitton, M., **Lok, B.**, Insko, B., and F. Brooks (2005). "Integrating Real and Virtual Objects" (Invited Paper) *1<sup>st</sup> International Conference on Virtual Reality 2005*, Las Vegas, NV July 22-27, 2005.
30. Zambaka, C., **Lok, B.**, Goolkasian, P., and L. Hodges (2005). "Lessons Learned in Virtual Human Research" (Invited Paper) *1<sup>st</sup> International Conference on Virtual Reality 2005*, Las Vegas, NV July 22-27, 2005.
31. **Lok, B.**, Naik, S., Whitton, M., and F. Brooks (2004). "Experiences in Extemporaneous Incorporation of Real Objects in Immersive Virtual Environments," *Beyond Glove and Wand Based Interaction Workshop, IEEE Virtual Reality 2004*, Chicago, IL, 107-110.
32. Zambaka, C., **Lok, B.**, Babu, S., Xiao, D., Ulinski, A. and L. Hodges (2004). "Effects of Travel Technique on Cognition in Virtual Environments," *IEEE Virtual Reality 2004*, Chicago, IL, 149-156, 286.
33. **Lok, B.**, Naik, S., Whitton, M., and F. Brooks (2003). "Incorporating Dynamic Real Objects into Virtual Environments," *ACM SIGGRAPH 2003*, 701. (Abridged version of *ACM 2003 Symposium on Interactive 3D Graphics* paper, one of three selected for representation)
34. **Lok, B.**, Naik, S., Whitton, M., and F. Brooks (2003). "Incorporating Dynamic Real Objects into Virtual Environments," *ACM 2003 Symposium on Interactive 3D Graphics*, Monterey, CA (April 28-30), ACM SIGGRAPH: 31-41. Images in *Communications of the ACM*, July 2003, 46.7: 48.
35. **Lok, B.**, Naik, S., Whitton, M., and F. Brooks (2003). "Effects of Handling Real Objects and Avatar Fidelity on Cognitive Task Performance in Virtual Environments," *IEEE Virtual Reality 2003*, Los Angeles, CA (March 22-26), IEEE: 125-132.
36. Mortensen, J., Vinayagamoorthy, V., Slater, M., Steed, A., **Lok, B.**, and M. Whitton (2002), "Collaboration in Tele-Immersive Environments," *Eighth Eurographics Workshop on Virtual Environments 2002*, Barcelona, Spain, May 2002: 30-31.
37. **Lok, B.** (2001). "Online Model Reconstruction for Interactive Virtual Environments," *ACM 2001 Symposium on Interactive 3D Graphics*, Chapel Hill, NC (March 19-21): 69-72, 248.

38. **Lok, B.**, Bauer, S., Monacello, C., Finnerty, S., and S. Sheno (1997). "An Organizational Framework for Distributed Medical Information," *Third Joint Conference on Information Systems '97*, 50-51.
39. **Lok, B.**, Bauer, S., Monacello, C., Finnerty, S., and S. Sheno (1997). "A Hypermedia System for Breast Cancer Screening," *Mid-America Symposium of Emerging Computing Technologies*.

#### **Magazine and Book Chapters/Articles/Editorships**

1. Doerner, R., Lok, B., Broll, W (2011). "Social Gaming and Learning Applications: A Driving Force for the Future of Virtual and Augmented Reality?" in Brunett, Guido; Coquillart, Sabine; Welch, Greg (Eds.): *Virtual Realities - Dagstuhl Seminar 2008*, Springer, Wien, New York, 2011 (ISBN 978-3-211-99177-0), pp. 51-76
2. Lind, D. and **B. Lok** (2006). The Role of Virtual Patients in Medical Education: Teaching Tool Versus Technological Trend. (Invited Article) *Focus on Surgical Education* 2006. 23(1), 28-29.
3. *Proceedings of the 2005 SCS Human-Computer Interface Advances for Modeling and Simulation (SIMCHI '05)* (2005) Eds. Fishwick, P. and **B. Lok**, 2005.
4. **Lok, B.** (2004). "Human Computer Interaction in Three Dimensional Computer Graphics." *Encyclopedia of Human Computer Interaction*. Ed. William Bainbridge. Barrington, MA: Berkshire, 2004.
5. **Lok, B.** and L. Hodges (2004). "Human Computer Interaction in Virtual Reality." *Encyclopedia of Human Computer Interaction*. Ed. William Bainbridge. Barrington, MA: Berkshire, 2004.
6. **Lok, B.** (2003). "Evaluation and Application of Algorithms for a Hybrid Environment System." *Energy, Simulation Training, Ocean Engineering and Instrumentation, Research Papers of the Link Foundation Fellows*. Ed. Brian Thompson. New York: University of Rochester Press, 2003, 3:149-175.

#### **Abstracts/Poster/Presentations**

1. Cendan, J., Lyons, B., Chuah, J., Johnson, T., Khalil, M., and Lok, B. "Understanding the Relationship Between Cognitive Load and Learning in a Technical Medical Education Environment" Annual Meeting of the Association of American Medical Colleges, Denver, CO., November 2011.
2. Foster, Noseworthy, Shah, Lind, Lok, Chuah, Rossen, "Evaluation of Medical Student Interaction with a Bipolar Virtual Patient Scenario Written by a Peer Support Specialist – a Pilot Study", Poster accepted at (Association of Directors of Medical Student Education in Psychiatry) ADMSEP 2010, Jackson Hole, WY, June 17-19, 2010.
3. Foster, Londino, Noseworthy, Lind, Shah, Lok, Chuah, Rossen, "The Use of Interactive Virtual Patients in an Integrated Psychiatry-Neuroanatomy Course and a Psychiatry Clerkship". Plenary accepted to ADMSEP 2010, Jackson Hole, WY, June 17-19, 2010.
4. DiPietro, J., Ferdig, R., Cao, L., Blackwelder, E., Shivashankar, S., & Lok, B. (2010). Mixed-reality simulations for education: Teaching and learning through virtual character interactions. American Educational Research Association (AERA) Conference. Denver, CO.
5. Gucwa, A., Kotranza, A., Raji, A., Rossen, B., Beatty, J., Laserna, C., Park, M., Pugh, C., Lok, B., Johsen, K., and D. Lind. "The Use of a Mixed Reality Breast Simulator with an Innovative Feedback System (Touch Map) to Enhance Breast Examination Skills," *Association for Surgical Education Annual Meeting 2009*, Salt Lake City. April 28th - April 30th 2009.
6. Gucwa, A., Beatty, J., Deladisma, A., Kotranza, A., Raji, A., Shah, H., Fox, P., Gehlot, A., Kruse, E., McLoughlin, J., Lok, B., Pugh, C., and D. Lind. "A Pilot Study to Evaluate the Use of Mixed Reality technology as a Tool for Assessing Medical Students' Communication Skills", *9th Annual International Meeting on Simulation in Healthcare (IMSH)*, Lake Buena Vista, FL. January 10-14, 2009.
7. Gucwa, A., Beatty, J., Kotranza, A., Rossen, B., Pugh, C., **Lok, B.**, and D. Lind "Gender Differences Among Students Undergoing a Mixed Reality Simulation in Breast History-Taking and Physical Examination" Presented at the *Association of Women Surgeons 2008*.
8. Deladisma, A., Imam, T., Kotranza, A.\*, Raji, A.\*, Bittner, J., **Lok, B.**, Pugh, C., and D. Lind. "The Use of Mixed Reality Humans to Teach Clinical Skills" to be presented at *47th Annual Conference on Research in Medical Education (RIME)*, October 31-November 5<sup>th</sup>, 2008, San Antonio, TX.
9. Cendan, J., Miller, B., Wang, X.\*, Horton, J.\*\*, and **B. Lok**. "Development of Virtual Patient with Fixed Cranial Nerve Pathology." *Southern Group on Education Affairs 2008*, April 3-5, Nashville, TN.
10. Craig, J., Deladisma, A., Gupta, M., Bittner, J., Johnsen, K.\*, **Lok, B.**, and D. Lind. "Novel Integration of a Life-Sized, Immersive Virtual Instructor with a Mannequin-Based Procedural Simulator to Teach Central Venous Catheterization." *8th Annual International Meeting on Simulation in Healthcare*. San Diego, CA. Jan 13-16, 2008.
11. Gupta, M., Deladisma, A., Kotranza, A.\*, Craig, J., Bittner, J., Johnsen, K.\*, **Lok, B.**, and D. Lind. "The Use of a Virtual Character-Enhanced Simulator to Teach Breast History and Examination Skills." *8th Annual International Meeting on Simulation in Healthcare*. San Diego, CA. Jan 13-16, 2008.
12. Deladisma, A., Gupta, M., Kotranza, A.\*, Bittner, J., Imam, T., Swinson, D., Nesbit, R., **Lok, B.**, Pugh, C., D. Lind. "A Pilot Study to Integrate an Immersive Virtual Patient with a Breast Complaint and Breast Exam Simulator into a Medical Student Surgery Clerkship." *Association for Surgical Education, Surgical Education Week 2008*.

13. Davenport, R., Mann, W., Lutz, B., Shaw, L., and **Lok, B.**, Perceived personal robotic technology needs among elders with mobility impairments, *International Conference on Aging, Disability and Independence (ICADI)*, St. Petersburg, Florida, Feb 21-23, 2008.
14. Mack, D., Deladisma, A., Bernard, T., Oxendine, C., **Lok, B.**, and D. Lind. "Virtual Patients Reduce Anxiety and Enhance Learning when Teaching Medical Student Sexual-History Taking Skills", *Society for Simulation in Healthcare. (Research Abstract Award 2nd place Education)*
15. Deladisma, A., Mack, D., Bernard, T., Oxendine, C. Szlam, S., Wagner, P., Kruse, E., **Lok, B.**, and D. Lind. "Virtual Patients Reduce Anxiety and Enhance Learning when Teaching Medical Student Sexual-History Taking Skills", *Association for Surgical Education 2007 Surgical Education Week. (Same as Mack et al. 07 abstract)*
16. Cohen, M., Stevens, A., Wagner, P., **Lok, B.**, Bernard, T., Oxendine, C. Schumacher, L., Johnsen, K.\* , Dickerson, R.\*\* , Raji, A.\* , Ross, R. Duerson, M., Parimala, J., and D. Lind. "How Comparable are Medical Student Empathetic Interactions in a Similar Virtual Patient/Standardized Patient Abdominal Pain Scenario?" *Southern Group on Education Affairs 2006.*
17. Bernard, T., Stevens, A., Wagner, P., Bernard, N., Schumacher, L., Johnsen, K.\* , Dickerson, R.\*\* , Raji, A.\* , **Lok, B.**, Duerson, M., Cohen, M. and D. Lind. "A Multi-Institutional Pilot Study to Evaluate the Use of Virtual Patients to Teach Health Professions Students History-Taking and Communication Skills." *Society of Medical Simulation Meeting 2006, Vol. 1, No. 2, 1-2. (Ranked #1 out of 104 accepted)*
18. Deladisma, A., Cohen, M., Stevens, A., Wagner, P., **Lok, B.**, Bernard, T., Oxendine, C., Schumacher, L., Johnsen, K.\* , Dickerson, R.\*\* , Raji, A.\* , Wells, R.\* , Duerson, M., Harper, J., and D. Lind. "Is There a Difference in the Empathetic Response of Health Professions to Standardize Patients and Virtual Patients?" *Association of Surgical Education 2006. (Clinical Research Award 2<sup>nd</sup> place, same as ASE abstract)*
19. Stevens, A., Cohen, M., Johnsen, K.\* , Dickerson, R.\*\* , Raji, A.\* , Wells, R.\* , Oxendine, C., Wagner, P., Bernard, T., Cendan, J., Duerson, M., Pauly, R., **Lok, B.**, and D. Lind, "Implementing a Virtual Patient (VP) into the Medical School Curriculum at the University of Florida (UF) " *Southern Group on Education Affairs 2006.*
20. Stevens, A., Hernandez, J., Johnsen, K.\* , Dickerson, R.\*\* , Raji, A.\* , Jackson, J., Shin, M., Cendan, J., Duerson, M., **Lok, B.**, and D. Lind (2005). The Use of Virtual Patients to Teach Medical Students Communication Skills. *Association of Surgical Education 2005.*
21. Babu, S.\*\*\*, Zambaka, C.\*\*\*, Jackson, J., Chung, T., **Lok, B.**, Shin, M., and L. Hodges. Virtual Human Physiotherapist Framework for Personalized Training and Rehabilitation (poster). *Graphics Interface 2005, Victoria, British Columbia, Canada, May 9-11, 2005.*
22. Stevens, A., Hernandez, J., Johnsen, K.\* , Dickerson, R.\*\* , Raji, A.\* , Jackson, J., Shin, M., Cendan, J., Duerson, M., **Lok, B.**, and D. Lind (2005). The Use of Virtual Patients to Teach Medical Students Communication Skills. *Southern Group on Education Affairs 2005. (Ranked #1)*

### Dissertation

**Lok, B.** (2002). Interacting with Dynamic Real Objects in Virtual Environments. Ph.D. Dissertation, Department of Computer Science, University of North Carolina at Chapel Hill.

### SERVICE and ACTIVITIES

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- **Steering Committee:**
  - IEEE Virtual Reality (2009-present)
- **General Chair:**
  - IEEE Virtual Reality 2013 (Orlando)
- **Program Co-Chair:**
  - IEEE Virtual Reality 2011 (Singapore)
  - IEEE Virtual Reality 2010 (Boston, MA)
  - ACM Symposium on Virtual Reality Software and Technology 2009 (Kyoto, Japan)
  - IEEE ISMAR 2009 Area Chair (Orlando, FL)
  - GameOn North America '07 (Gainesville, FL)
  - Human-Computer Interaction Advances in Modeling and Simulation - Society for Computer Simulation Western Multiconference 2005 (New Orleans, LA)
- **Program Committee:**
  - IEEE Virtual Reality (2003-2011)
  - IEEE 3D User Interfaces (2011)
  - IEEE ISMAR (2004-2006, 2008-2009)
  - International Conference on Intelligent Virtual Agents (IVA) (2009-2010)
  - ACM Symposium on Virtual Reality Software and Technology (2007-2010)

- INTUITION Workshop & Conference on Virtual Reality and Virtual Environments (2007-2009)
- Visual Learning Conference (2007-20010)
- Eurographics Symposium on Virtual Environments (2007)
- International Symposium on Visual Computing (2007-2010)
- **Panels Chair:** IEEE Virtual Reality 2007
- **Videos Chair:** IEEE Virtual Reality 2009
- **Posters Chair:** IEEE ISMAR 2006, ACM VRST 2007, IEEE Virtual Reality 2010
- **Tutorials Chair:** IEEE Virtual Reality 2006
- **Session Chair:** IEEE Virtual Reality (2007-2004), WMC SIMCHI 2005
- **Best Paper Award Committee:** IEEE Virtual Reality (2004-2005)
- **Conference Reviewer:** (In addition to the above conferences), SIGGRAPH (2008), Eurographics Symposium on Virtual Environments, IEEE Visualization, Pacific Graphics
- **Journal Reviewer:**
  - Journal on Presence: Teleoperators and Virtual Environments
  - Journal on Graphics Tools
  - IEEE Transactions on Computer Graphics and Visualization
  - International Journal of Human-Computer Studies (2008, 2009)
  - Journal of Virtual Reality and Broadcasting (2008)
- **Book Reviewer:** McGraw-Hill Publishing, Cambridge University Press
- **Proposal Review Panels:** National Science Foundation (2004, 2007, 2008, 2009, 2011, 2012)
- **Invited Panels:**
  - Avatar/Virtual Human Workshop – Department of Defense, Marina Del Ray, California, April, 2009. (One of two groups invited from academia)
  - Virtual Worlds and Virtual Humans – *France-US Frontiers of Science Symposium, National Academy of Science*, Roscoff, France, November, 2008
  - OSCEs and Virtual Patient Simulations in Pharmacy Education: International Experiences and Research Findings – *2008 Joint American Association on College of Pharmacy/ Association of Faculties of Pharmacy in Canada Annual Meeting*, Chicago, IL, July 22, 2008.
  - Medical and Healthcare Simulation Future Mapping Session – *National Center of Simulation*, Orlando, FL, May, 2008
  - User Studies in VR: What Can We Learn From Them and What Are They Good For? - *IEEE Virtual Reality 2008*, March, 2008
  - Student Panel: Building the Future of and a Career in VR - *IEEE Virtual Reality 2007*, March 2007
  - VR Support of Clinical Applications: Collaboration, Politics, & Ethics - *IEEE Virtual Reality 2007*, March, 2007
  - Bridging Simulation and HCI – *SIMCHI '05*, January 2006

## TEACHING

### University of Florida

*Spring 2012: Human Computer Interaction (Undergrad/Grad)*

*Fall 2011: Parental Leave*

*Spring 2011: Sabbatical*

*Fall 2010: Human Computer Interaction (33 Undergrad/Grad)*

*Spring 2010: Human Computer Interaction (42 Undergrad/Grad)*

*Spring 2009: Virtual Environments (CAP6930/4930) (7 Undergrad/Grad)*

*Fall 2008: Human Computer Interaction (CAP6930/4930) (37 Undergrad/Grad)*

*Spring 2008: Computational Structures in Computer Graphics (CAP4730), (38 Undergraduates)*

*Fall 2007: Virtual Environments (4 university course) (CAP6930/4930) (4 Undergrad/Grad)*

*Fall 2007: Human Computer Interaction (CAP6930/4930) (15 Undergrad/Grad)*

*Spring 2007: Advanced Computer Graphics and Virtual Environments (CAP6930/4930) (5 Grad)*

*Fall 2006: Human Computer Interaction (CAP6930/4930) (9 Grad)*

*Spring 2006: Computational Structures in Computer Graphics (CAP4730), (46 Undergraduates)*

*Fall 2005: Design and Creation of Virtual Environments (CIS6930/4930), (19 Undergrad/Grad)*

*Spring 2005: Computational Structures in Computer Graphics (CAP4730), (51 Undergraduates)*

*Fall 2004: Human Computer Interaction (CAP6930/4930), (21 Undergrad/Grad)*

*Spring 2004: Computational Structures in Computer Graphics (CAP4730), (55 Undergraduates)*

*Fall 2003: Design and Creation of Virtual Environments (CIS6930/4930), (19 Undergrad/Grad)*

### University of North Carolina at Charlotte

Spring 2003: **Design and Analysis of Algorithms** (ITCS2215), (40 Undergraduates)

**University of North Carolina at Chapel Hill**

Fall 2000: **Introduction to Computer Graphics** (COMP136), (12 Undergrad/Grad)

**PATENTS**

---

PCT/US2010/050393 REAL-TIME FEEDBACK OF TASK PERFORMANCE. International Filing Date: 9/27/10.

PCT/US10/023877 COMMUNICATION AND SKILLS TRAINING USING INTERACTIVE VIRTUAL HUMANS.

International Filing Date: 2/13/09.

PCT/US-2010-0159434-A1 MIXED SIMULATOR AND USES THEREOF.

**CONSULTING**

---

September 2009 – August 2011 – SimCoach, University of Southern California (ICT)

**OTHER WORK**

---

**Invited Short Course**

Virtual Environments, Jaypee Institute of Information Technology, New Delhi, India, March 24<sup>th</sup>-28<sup>th</sup>, 2008.

**Invited Talks**

2011

College of Medicine and Nursing, University of South Florida (December)

+ AAAP Annual Meeting, Scottsdale, AZ (December)

Keynote, 8th International Symposium on Visual Computing, Las Vegas, NV. (September)

+ Tufts Health Care Institute Program on Opioid Risk Management, Boston, MA. (March)

2010

The Dynamo: UF Chapter of the Roosevelt Institute (keynote)

UF Health Sciences Center Symposium

2008

Kavli France-US Frontiers of Science Symposium, *National Academy of Science*, Roscoff, France

Tulsa Undergraduate Research Challenge, *University of Tulsa*,

*Northwestern University*

\*Simulation Faculty Learning Community Seminars

Virtual Realities Dagstuhl Seminar, Schloss Dagstuhl (Germany)

2007

Department Seminar, *University of Georgia*

\*Education Grand Rounds, *Medical College of Georgia*

Invited Lecture Series, *Medical College of Georgia*

Department of Computer Science Lecture Series

\*Department of Computer Science Lecture Series

\*First Fridays Lecture Series, Sigma Xi Honor Society

\*Institute of Creative Technologies, *University of Southern California*

College of Medicine, *University of Southern California*

\*Pain Research Forum, Department of Health and Human Performance

\*Cognitive Forum, Department of Psychology

2005

Graduate Computer Science Colloquium Series, *University of North Carolina at Charlotte*

Computer Science Colloquium Series, *University of North Carolina at Chapel Hill*

\*Computer Science Colloquium Series, *Old Dominion University*

\*Geriatric Education Group

\*Association of Digital Art and Media

Vision Imaging and Virtual Environments Research Group, *University of College London*

2004

Virginia Tech Virtual Environments Research Group, *Virginia Polytechnic University*

\*School of Education Human-Computer Interaction Course

\*Center for Learning and Simulation

\*Introduction to Digital Arts and Science Course  
 \*Center for Neurological Science  
 \*Medical Educational Grand Rounds  
 Florida Research Consortium, *Technology Transfer Consortium 2004*  
 \*Gainesville VA Hospital, Brain Rehabilitation Research Center  
 Center for Information Security, *University of Tulsa*  
 †Tulsa Undergraduate Research Challenge Reception, *University of Tulsa*

### 2003

Human-Interface Laboratory, *University of Washington*  
 \*G2V2, University of Florida, “

† - Financially supported invited talks, \*-University of Florida talks

## REFERENCES

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Name: **Dr. Frederick P. Brooks Jr.**  
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 Chapel Hill, NC 27599-3175  
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 Telephone: (919) 962-1931  
 Internet: brooks@cs.unc.edu, <http://www.cs.unc.edu/~brooks>  
 Comments: Kenan Professor of Computer Science, 1999 Turing Award Winner, *Ph.D. Advisor*

Name: **Dr. Larry F. Hodges**  
 Postal: School of Computing  
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 Clemson, SC 29634  
 Telephone: (864) 656-7552  
 Internet: [lfh@clemson.edu](mailto:lfh@clemson.edu) <http://people.clemson.edu/~lfh>  
 Comments: hf Flagship Director of the School of Computing, *Post-Doctoral Advisor*.

Name: **Dr. Sartaj Sahni**  
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 Gainesville, FL 32611  
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 Internet: [sahni@cise.ufl.edu](mailto:sahni@cise.ufl.edu), <http://www.cise.ufl.edu/~sahni>  
 Comments: Distinguished Professor and Chair of CISE, *Department Chair*.