

Lauren Cairco Dukes

405 Brown Rd. Apt 22

Pendleton, SC 29670

www.laurencaircodukes.com//lauren.c.dukes@gmail.com

Education

Clemson University

Clemson, SC 29631

Ph.D. in Computer Science in progress since Fall 2009

M.S. in Computer Science completed December 2012

Concentrations in Algorithms and Graphics

GPA: 3.94/4.00

Winthrop University

B.S. in Computer Science, Magna cum laude

Mathematics minor

Graduation date: May 2009

GPA: 3.83/4.00

Current Research Project

Scaffolded Virtual Patient Interaction for Pediatric Nursing Education

Fall 2009-present, Clemson University

- Developing a system with high-fidelity virtual humans acting as patients who answer nurse questions, using Unity3D
- Researching and implementing appropriate learning scaffolding tools to support students as they learn interview techniques
- Collaborating with nursing professors and students at Clemson University for scenario design and software usability evaluation
- Designing authorship tools to enable scenario creation by subject matter experts

Previous Research Projects

Simulation of Rapidly Deteriorating Patients for Nurse Training

December 2010-May 2013, Clemson University

- Simulated rapidly deteriorating patients' behavior and vital signs within a virtual hospital and electronic health record system, based on actual patient case files from St. Francis Hospital
- Designed and implemented effective interaction metaphors so that nurses may effectively use the virtual hospital and electronic health record
- Evaluated design decisions through user studies with student nurses
- Developed reporting tools so that nurses may receive feedback on their observation skills

Augmented Reality in Inspection and Quality Control

Fall 2009 – Spring 2010, Clemson University

- Collaborated with BMW Spartanburg and mechanical engineers at Clemson University to design multimodal user interfaces to aid in vehicle inspection
- Designed systems to present the checklist to the inspectors and to let them mark items as passing or failing inspection through voice or touch
- Implemented software for the inspection process on PC and Palm Pre hardware using Microsoft SAPI, OpenGL, Microsoft MFC, Javascript, and PHP
- Evaluated hardware options (augmented reality, large screen, and Palm Pre) for interface through user studies on-site with employees and in the laboratory with novice users

Pic-Up: Encouraging Reuse & Contribution in HCI Storyboarding

Summer 2008, Human Computer Interaction REU at Virginia Tech

- Developed an application called Pic-Up to support HCI product design through storyboarding using Adobe Flex and PHP
- Pic-Up presents the user with pictorial “cards” for building their storyboard, with each card representing an artifact and listing its pros and cons
- Pic-Up aims to encourage reuse and contribution of knowledge by maintaining a centralized online database of user-submitted cards
- Conducted a pilot usability study

AVARI: Animated Virtual Agent Retrieving Information

Summer 2007-Spring 2008, Computer Science REU at UNC Charlotte and Stars Alliance: Research Group at UNC Charlotte

- Collaborated with a team to develop a virtual character who uses synthesized speech and speech recognition designed to be usable by people unfamiliar with interaction with virtual characters
- Implemented AVARI components in Javascript, PHP, XML, SALT, MySQL
- Designed and implemented AVARI’s conversational structure
- Developed software for AVARI’s vision in Matlab and Java
- Wrote code to integrate components from other group members
- Tied for first place award for end of REU presentation
- Developed an online version of AVARI for a speech applications contest, including a web interface for editing AVARI’s knowledge base
- Analyzed data gathered from AVARI’s conversations

Shakespearean Karaoke

Summer 2006, Computer Science REU at UNC Charlotte

- Modified existing framework to develop new application called Shakespearean Karaoke using C++, OpenGL, 3DsMax, and Haptik
- Shakespearean Karaoke allowed a user to act out a scene with a virtual actress using a joystick and a head-mounted display
- Tied for second place award for end of REU presentation

Fall 2006-Spring 2007,

Cognitive Science REU and Stars Alliance: Research Group at UNC Charlotte

- Modified Shakespearean Karaoke (SK) to be projected on a large screen
- Designed and carried out user study to find out how well people learned about the play using SK compared to how well they learned by reading
- Participated in ethics, research, and leadership seminars with other students

Research Internship Projects

Helmet-mounted Projector Systems for Virtual Character Displays

Summer 2013, University of Southern California Institute for Creative Technologies, Los Angeles, CA

- Implemented game for participants to play with a virtual character displayed with a helmet-mounted projector system
- Conducted a user study on how perspective-correct projection of a virtual character affected gameplay
- Became proficient at using Phasespace motion capture

Automated Calibration of Display Characteristics

Summer 2013, University of Southern California Institute for Creative Technologies, Los Angeles, CA

- Implemented computer vision and graphics algorithms to automatically generate a distortion-correcting texture map for arbitrary lens systems
- Programmed algorithms to extend and correct anomalies in the generated texture map

Tablet Touch Screen Controls for Visualizations

Summer 2013, University of Southern California Institute for Creative Technologies, Los Angeles, CA

- Designed simple gesture recognition algorithms so that users could draw their own slider and dial controls on a tablet
- Implemented network communication so that control values could be sent to external applications

Haptics in Medical Simulation

Summer 2011, Charles River Analytics, Cambridge, MA

- Completed literature reviews on techniques for multimodal surgical simulation
- Evaluated haptic simulation toolkits
- Wrote monthly reports for the funding agency detailing research findings and plans for future progress
- Presented project results at company seminar

Leadership, Teaching, and Mentoring Experiences

Graduate Instructor of Record

Fall 2013-present, Clemson University

- Preparing and presenting lectures for course in introduction to C
- Creating and grading programming assignments for students
- Providing individualized help through office hours

Graduate Mentor for Human Centered Computing REU

Summer 2010, Clemson University

- Created tutorials and assignments for skills students needed
- Assigned project responsibilities to students based on skills and interests
- Assisted students in completing their responsibilities by providing pseudocode as needed and instructing in software engineering principles
- Provided social support for students

Stars Alliance: Member & Team Leader of Research Group

Fall 2007-Spring 2009, UNC Charlotte

- Mentored team members and a lower level computer science student
- Lead team meetings, coordinated team events, and made outside contacts
- Developed Girl Scout Internet safety curriculum with other team members
- Installed computers in Habitat for Humanity homes
- Developed versions of Internet safety materials appropriate for adults
- Planned and hosted outreach events for underrepresented groups
- More information about Stars Alliance: <http://www.starsalliance.org/>

Publications

Fully Reviewed Papers

Wu, X., Bertrand, J., Armstrong, R., Roy, T., Ebrahimi, E., **Dukes, L. C.**, Daily, S., Luo, J., Fasolino, T., Hodges, L. F., and Babu, S. (2014) Effects of Virtual Human Animation on Emotion Contagion in Simulated Inter-Personal Experiences. To appear in Proceedings of *IEEE Virtual Reality 2014* (IEEE VR 2014), March 29-April 2, 2014, Minneapolis, MI.

Pence, T. B., **Dukes, L.C.**, Hodges, L.F., Meehan, N. and A. Johnson. (2013) The Effects of Interaction and Visual Fidelity on Learning Outcomes for a Virtual Pediatric Patient System. In Proceedings of *International Conference on Healthcare Informatics 2013* (ICHI 2013), September 9-12, 2013, Philadelphia, PA, pp. 209-218. Acceptance rate: 30%.

Dukes, L.C., Bertrand, J., Gupta, M., Armstrong, R., Fasolino, T., Babu, S., and Hodges, L.F. Empirical Evaluation of Traditional vs. Hybrid Interaction Metaphors in a Multitask Healthcare Simulation. In Proceedings of *International Conference on Healthcare Informatics 2013* (ICHI 2013), September 9-12, 2013, Philadelphia, PA, pp. 89-98. Acceptance rate: 30%. **Best paper award.**

Dukes L. C., Pence, T. B., Hodges, L. F., Meehan, N., Johnson, A. (2013) SIDNIE: Scaffolded Interviews Developed by Nurses in Education. In Proceedings of *Intelligent User Interfaces 2013 (IUI 2013)*, Santa Monica, CA, March 19-22, 2013, pp. 395-406. Acceptance rate: 22%.

Dukes, L.C., Banic, A. U., McClendon, J., Pence, T. B., Mathieson, J., Summers, J., Hodges, L.F. (2013) Evaluation of System-Directed Multimodal Systems for Vehicle Inspection. *Journal of Computing and Information Science in Engineering* 13.1 (2013), pp. 011002-1 - 011002-9.

Cairco, L., Ulinski, A., McClendon, J., Bloodworth, T., Mathieson, J., Hodges, L.F., and Summers, J. (2010) Interface Design and Display Modalities to Improve the Vehicle Inspection Process. In Proceedings of *ASME 2010 World Conference on Innovative Virtual Reality* (Ames, IA, May 12-14, 2010), WINVR2010, pp. 275-284.

Wahid, S., Branham, S., **Cairco, L.**, McCrickard, D.S., and Harrison, S. (2009) Picking Up Artifacts: Storyboarding as a Gateway to Reuse. In Proceedings of *Interact 2009: The 12th IFIP Conference on Human-Computer Interaction* (Uppsala, Sweden, August 24-28, 2009), pp. 528-541. Acceptance rate: 29%.

Cairco, L., Wilson, D.M., Fowler, V., LeBlanc, M. (2009) Avari: Animated Virtual Agent Retrieving Information. In Proceedings of the 47th ACM Southeast Conference (Clemson, SC, USA, March 19-21, 2009). ACMSE '09.

Dahlberg, T., Barnes, T., Rorrer, A., Powell, E., and **Cairco, L.** (2008) Improving retention and graduate recruitment through immersive research experiences for undergraduates. In Proceedings of the 39th *SIGCSE Technical Symposium on Computer Science Education* (Portland, OR, USA, March 12 - 15, 2008). SIGCSE '08. ACM, New York, NY, pp. 466-470.

Posters

Dukes, L.C., Hodges, L. F. (2014). Poster: Development of a Scenario Generation Tool for Scaffolded Virtual Patients. To appear in Proceedings of *IEEE Virtual Reality 2014* (IEEE VR 2014), March 29-April 2, 2014, Minneapolis, MI.

Jones, J. A., **Dukes, L. C.**, Bolas, M. (2014) Poster: Automated Calibration of Display Characteristics (ACDC) for Head-Mounted Display and Arbitrary Surfaces. To appear in Proceedings of *IEEE Virtual Reality 2014* (IEEE VR 2014), March 29-April 2, 2014, Minneapolis, MI.

Krum, D., Phan, T., **Dukes, L. C.**, Wang, P., Bolas, M. (2014) Poster: Tablet-based Interaction Panels for Immersive Environments. To appear in Proceedings of *IEEE Virtual Reality 2014* (IEEE VR 2014), March 29-April 2, 2014, Minneapolis, MI.

Dukes, L.C., Bertrand, J., Gupta, M., Armstrong, R., Fasolino, T., Babu, S., and Hodges, L.F. (2013) Poster: Comparing Usability of a Single versus Dual Interaction Metaphor in a Multitask Healthcare Simulation. In Proceedings of *IEEE Three Dimensional User Interfaces 2013 (IEEE 3DUI 2013)*, Orlando, FL, March 16-17, 2013, pp. 133-134.

Cairco, L., and McCrickard, D. S. (2009) Encouraging Design Reuse and Contribution in HCI Storyboarding. In ACM Student Research Competition at SIGCSE (Chattanooga, TN, USA, March 4-7, 2009). SIGCSE '09.

Cairco, L., S. Babu, A. Ulinski, C. Zanbaka, L. F. Hodges (2007). Shakespearean Karaoke. In Proceedings of *ACM Virtual Reality Systems and Technology 2007 (VRST07)*, Newport Beach, CA, November 5-7, 2007, pp. 239-240.

Presentations & Demos

Bertrand, J.; **Cairco Dukes, L.**; Dukes, P.; Ebrahimi, E.; Hayes, A.; Mack, N.; McClendon, J.; Parmar, D.; Pence, T.B.; Shannon, B.; Wachter, A.; Yanxiang Wu; Babu, S.; Hodges, L.F., (2013). Serious games for training, rehabilitation and workforce development. *IEEE Virtual Reality (VR) 2013*, pp.195,196, 18-20 March 2013.

Dukes, L. (2013) Empirical Evaluation of Traditional vs. Hybrid Interaction Metaphors in a Multitask Healthcare Simulation. Visual Computing Seminar, Clemson University, August 30, 2013.

Dukes, L. (2013) My Summer Internship at ICT. Visual Computing Seminar, Clemson University, October 25, 2013.

Dukes, L. (2012) Research as Community Service. School of Computing Graduate Student Association Tech Talks Series. September 27, 2012.

Cairco, L., Bertrand, J., Gupta, M., Armstrong, R., Babu, S., Hodges, L. F., Fasolino, T. (2012) Towards Simulation Training for Nursing Surveillance. In Proceedings of Carolina Women in Computing 2012 (CWIC 2012). Columbia, SC, February 17-18, 2012.

Bloodworth, T., **Cairco, L.**, McClendon, J., Hodges, L. F., Babu, S., Meehan, N., Johnson, A., and Ulinski, A. C. (2012) Initial Evaluation of a Virtual Pediatric Patient System. In Proceedings of Carolinas Women in Computing (CWIC) 2012. Columbia, SC, February 17-18, 2012.

Cairco, L. (2011) Lessons Learned as a Woman in Computing. Winthrop University, Rock Hill, SC. March 22, 2011.

Academic Honors

Clemson School of Computing Outstanding Ph.D Student of the Year, 2013
Accepted into IEEE VR 2014 Doctoral Consortium
Best Paper Award for International Conference for Healthcare Informatics 2013
Clemson University School of Computing Masters' Student of the Year, 2012
2009 NSF Graduate Research Fellowship Recipient
Clemson University R.C. Edwards Graduate Fellowship Recipient, Fall 2009
Recipient of 2008 Essam El-Kwae Student-Faculty Research Award, with Dr. Larry F. Hodges and other members of the AVARI team
Accepted into 2008 Google Workshop for Women Engineers
Recipient of South Carolina Palmetto Fellows Scholarship
Recipient of Winthrop University Trustees Scholarship
Recipient of ACM-W Conference Attendance Scholarship for VRST 2007
Member of Phi Kappa Phi Honors Society
Member of Upsilon Pi Epsilon National Computer Science Honors Society
Vice President of Winthrop University Chapter of Kappa Mu Epsilon National Mathematics Honors Society (Fall 2008-Spring 2009)

Other Activities

Computer Science Graduate Student Association Secretary (2010 Academic Year)
President of Winthrop University ACM chapter (Fall 2007-Spring 2009)
ACM International Collegiate Programming Competition participant (2007-2009)