

June 30, 2020

**HECTOR M. GARCIA, M.Arch.**  
**Simulation Experience and Analysis Lab Manager**  
**Lead Project Scientist**

Virginia Modeling Analysis and Simulation Center  
Old Dominion University  
1030 University Blvd.  
Suffolk, VA 23435

Phone: (757) 638-6315  
Fax: (757) 686-6214  
E-mail: [hgarcia@odu.edu](mailto:hgarcia@odu.edu)

**Education:**

**Masters in Architecture, University of Houston, Houston, TX, May 1997**  
Research Area: Interactive Virtual Environments for Architectural Visualization.

**Bachelor of Architecture, Universidad Regiomontana, Monterrey, MX, May 1994**

**Professional Chronology:**

**Virginia Modeling, Analysis & Simulation Center, Old Dominion University, Norfolk, VA.**  
Simulation Experience and Analysis Lab Manager / Lead Project Scientist, 2014 - Present.

**Virginia Modeling, Analysis & Simulation Center, Old Dominion University, Norfolk, VA.**  
Visualization Lab Manager / Senior Project Scientist, 2002 - 2014.

**Virginia Modeling, Analysis & Simulation Center, Old Dominion University, Norfolk, VA.**  
Project Scientist, 2000 - 2002.

**Virtual Environments Technology Laboratory, University of Houston, Houston, TX.**  
Researcher, 1997 - 2000.

**Gerald D. Hines College of Architecture, University of Houston, Houston, TX.**  
Guest Lecturer, 1997 -1999

**Responsibilities:**

- Research and development of methods for computer graphics, used in, visualization, simulation, animation, and 'virtual reality'.
- Work closely with industry, academia and Principal Investigators on R&D projects to ensure vision and quality expectations.

- Manage and direct small team of staff and student's for the implementation of the R&D project vision and deliverables.
- Act as liaison between funding organizations and, staff, students, and other development staff to see design implementation through to completion.
- Build Immersive Virtual Environments for training using Unity3D, CaveLib, VirTools, Vega, Open Inventor, Performer, Multigen Creator, Google Sketchup, Maya and 3D Studio MAX.
- Manage High-end Visualization equipment both for UNIX and PC based including CAVE, Immersive Wall, Elumens Dome, Oculus Rift, HTC Vive, Microsoft Hololens and interactive tracking peripherals.
- Manage High-end optical motion tracking equipment for full body and facial motion capture.
- Ability to collaborate with others on achieving an appropriate R&D environment.
- Strong communication and management skills.
- Work closely with staff and students to achieve appropriate visual style.
- Act as the Technical Lead for Visualization on R&D projects.

**Selected Accomplishments:**

- Principal Technical Lead for the development of a Process Driven Framework for Augmented Reality in a Manufacturing Environment in support of a research initiative of the Commonwealth Center for Advanced Manufacturing under their G-077 program.
- Principal Technical Lead for the development of a 3D interactive simulation for Nursing pain assessment and management in support of a research initiative of the Old Dominion University College of Education and College of Nursing.
- Principal Technical Lead for the development of a 3D interactive simulation for Ultrasound Tool Training in support of a research initiative of the Virginia Modeling Analysis and Simulation Center.
- Invited to participate in the Institute of Medicine Game Arcade in Washington DC, showcasing the medical games that VMASC has been developing on the TATRC project.
- Principal Technical Lead in support of TATRC Nursing Project for an Avatar Based Team STEPPS training module with mini-games.
- Principal Technical Lead for the development of a 3D interactive simulation for Patient Blood Management in support of a research initiative of the Virginia Modeling Analysis and Simulation Center.

- Principal Technical Lead for the development of the ‘Virtual Reality Gait Rehabilitation Project’ research initiative of the Old Dominion University College of Health Sciences and the Old Dominion University Research Foundation.
- Principal Technical Lead for the development of the ‘Virtual Operating Room’ research initiative for the National Collaborative Center for Medical Modeling and Simulation, showcased in the coverage for the May 2006 issue of the Virginia Business Magazine pp 10-18.
- Principal Technical Lead and patent holder for the development of a system, method and medium for simulating normal and abnormal medical conditions on standardized patients.
- Principal Technical Lead and patent holder for the development of a surgical simulator to support wound debridement.
- Principal Technical Lead and patent holder for the development of a Portable Haptics Display in support of the wound debridement project.
- Principal Technical Lead for the development of the ‘next generation’ surgical training simulator for the National Collaborative Center for Medical Modeling and Simulation.
- Principal Technical Lead in the implementation of a visualization concept for the U.S. Joint Forces Command Joint Futures Lab “Virtual Campaign Management System”.
- Principal Technical Lead in the development of the requirements for a Training Support System (TSS) Visualization and War game Facility for the Army Training Support Center.
- Principal technical Lead in the development of a Cryogenics Training Course Enhancement for the Center for Naval Engineering in Portsmouth, VA. Researched the use of Modeling, Simulation and Visualization technologies as instructional material for enhancing the teaching/training of operating a cryogenics plant.
- Principal Technical Lead on the development of an augmented reality training simulation of the International Space Station pressure pane assembly window for NASA Johnson Space Center.
- Principal Technical Lead on the development of scenarios and simulations used in NASA project NCC-9-135 for studying the effects of cyber sickness in navigation and task execution.
- Principal Technical Lead in the design and implementation of a 3D immersive visualization wall system in support of the Virginia Modeling and Simulation Center’s Battle Lab Facility.

- Principal Technical Lead for the development of an ONR Virtual Environment for training grant project, featuring a check-point scenario simulation using shared collaborative environments, CAVE display and Desktop display systems, magnetic tracking devices and voice recognition software.
- Principal Technical Lead and animator for the Old Dominion University Maglev 3D visualization project.
- Principal Technical Lead in the installation and operation of the VMASC-EAST Virtual Environments Laboratory. This included the setup of an immersive wall display, immersive workbench, acoustical tracking, electromagnetic tracking, main UNIX server, high-end Silicon Graphics supercomputers, Head Mounted Displays and a pneumatic 2 degree of freedom motion base.
- Principal Technical Lead in the design, installation and display of a 9'x9' "CAVE" like display system for the IITSEC conference in Orlando, FL.
- Design studio professor for the graduate program of the Master's of Architecture at the University of Houston.
- Team member for the development of a Virtual Reality simulator for designing and analyzing the cockpit of the ship utilized for the Mars Mission.
- Team member for the development of a Shared Virtual Reality astronaut Training environment for the Bio-Technology Facility Module of the International Space Station.
- Developer of a Virtual Reality portable display system for design and visualization of architectural spaces using rear projection technologies and PVC structure.
- Team member for the development of a Virtual Reality astronaut Training environment for the assembly of the International Space Station.

### **Technical Expertise:**

Operating Systems: Microsoft OS family, Linux (Redhat), UNIX (Irix), Mac OSX

CAD Tools: AutoCAD, Maya, Autodesk Inventor, Autodesk Motion Builder, 3D Studio Max, Multigen Creator, Google Sketchup.

VR Tools: Unity 3D, Vega, VirTools, VR Tools, Eon Professional, CaveLib, VRscape, VGeo, trackD, Vega Prime, VRML, Open Scene Graph.

Character Animation Tools: Autodesk Motion Builder, Motion Capture systems.

Video Editing/Production: Photoshop, Premiere, Encore Soundbooth

Web Development: HTML, WebGL, CSS, ASP, PHP, Dreamweaver.

Languages: native Spanish, fluent in English.

## Selected publications:

1. Newcomb, T. L., Bruhn, A. M., Giles, B., Garcia, H. M., & Diawara, N. (2017). Testing a Novel 3D Printed Radiographic Imaging Device for Use in Forensic Odontology. *Journal of forensic sciences*, 62(1), 223-228.
2. K. J. Rechowicz, H. Garcia (2016). Process driven framework for augmented reality in a manufacturing environment. *Proceedings of the 15th International Conference on Modeling and Applied Simulation*: 65-72.
3. Ren, Shuo, Frederic D. McKenzie, Sushil K. Chaturvedi, Ramamurthy Prabhakaran, Jaewan Yoon, Petros J. Katsioloudis, and Hector Garcia. "Design and comparison of immersive interactive learning and instructional techniques for 3d virtual laboratories." *Presence* 24, no. 2 (2015): 93-112.
4. Sokolowski, John A., **Hector M. Garcia**, William Richards, and Catherine M. Banks. "Developing a low-cost multi-modal simulator for ultrasonography training." In *Proceedings of the Conference on Summer Computer Simulation*, pp. 1-5. Society for Computer Simulation International, 2015.
5. Romero, E.J., Watson, G.S., Papelis, Y. & **Garcia, H.** (2014). Nursing pain assessment & management: A 3D interactive simulation. *International Journal of Designs for Learning*, 5(1), pp. 43-56.
6. Strater, Laura, Rebecca A. Kennedy, Mark W. Scerbo, Yiannis Papelis, Menion Croll, **Hector Garcia**, Tami Griffith et al. "Me and My VE, Part 3." In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, vol. 58, no. 1, pp. 2397-2401. SAGE Publications, 2014.
7. Scerbo, M.W., Croll, M.M., **Garcia, H.M.**, Stefanidis, D., Britt, R. C., Davis, S. S. (Jan. 2013). A spatial task for measuring laparoscopic mental workload. *The 13th International Meeting on Simulation in Healthcare*, Orlando, FL.
8. Sokolowski, John A., Catherine M. Banks, William T. Richards, and **Hector M. Garcia**. "Challenges with simulator development for ultrasonography training: developing hardware-software interface." In *Proceedings of the Emerging M&S Applications in Industry & Academia/Modeling and Humanities Symposium*, p. 4. Society for Computer Simulation International, 2013.
9. Sokolowski, John A., Catherine M. Banks, **Hector M. Garcia**, and William T. Richards. "Developing an Ultrasonography Simulator Training Tool." *International Journal of Privacy and Health Information Management (IJPHIM)* 1, no. 2 (2013): 17-27.
10. Chaturvedi, S. K., Yoon, J., Mckenzie, R., Katsioloudis, P. J., **Garcia, H. M.**, & Ren, S. (2012). Implementation and Assessment of Virtual Reality Experiment in the Undergraduate Thermo-fluids laboratory. In *American Society for Engineering Education*. American Society for Engineering Education.
11. Papelis, Yiannis, Menion Croll, **Hector Garcia**, Brett Newman, Ashraf Omran, Sean Potter, Craig Gramlich, and Jake Tynis. "Maturity Enhancements for Aircraft Simulation for Traffic Operations Research." In *AIAA Modeling and Simulation Technologies Conference*, p. 6374. 2011.
12. Scerbo, M. W., **Garcia, H. M.**, Belfore II, L. A., Weireter Jr, L.J., Rushing, G D., Jackson, M. W., Baydogan, E., Nalu, A., & Newlin, E. T. (2009). A virtual operating room for surgical teams. *The 9th International Meeting on Simulation in Healthcare*. Orlando, FL.

13. M. Scerbo, L. A. Belfore II, **H. M. Garcia**, L. J. Weireter, Jr, M. W. Jackson, A. Nalu, E. Baydogan, J. P. Bliss, J. Seevinck, "A Virtual Operating Room for Context Relevant Training," Proceedings of Human Factors and Ergonomics Society 51st Annual Meeting, 2007
14. M. W. Scerbo, L. A. Belfore II, **H. M. Garcia**, L. J. Weireter, Jr. J. R. Crouch, Y. Shen, F. D. McKenzie, J. A. Seevinck, S. Girtelschmid, E. Baydogan, E. A. Schmidt, "A Simulation-Based Training System for Surgical Wound Debridement," Proceedings of the 14th Medicine Meets Virtual Reality Conference, Long Beach, California, January 2006.
15. M. Scerbo, L. Belfore, **H. Garcia**, M. Jackson, A. Nalu, E. Baydogan, L. Weireter, "The Virtual Operating Room," Proceedings of the 2006 Interservice/Industry Training, Simulation & Education Conference, Dec. 4-7, 2006, Orlando, Florida.
16. Frederic D. McKenzie, **H. M. Garcia**, Quynh-Ahn H. Nguyen, Jen Seevinck, Mikel D. Petty "Mogadishu Terrain Generation and Correlation for Crowd Modeling (04S-SIW-135)" Abstract of the Spring 2004 Simulation Interoperability Workshop, Arlington VA, April 18-23 2004.
17. D. A. Dryer, L. A. Belfore, M. D. Petty, M. Phillips, **H.M. Garcia**, J. Seevinck, R. B. Loftin, and T. Mastaglio, "A Methodology for Rapid Assessment of Simulation Technology and Application to Soldier CATT", Proceedings of the Fall 2004 Simulation Interoperability Workshop, Orlando FL, September 19-24 2004, pp. 403-414.
18. Frederic D. McKenzie, **H. M. Garcia**, Reynel J. Castelino, Heidi Plebani, Thomas W. Hubbard, John A. Ullian, Gayle A. Gliva "Augmented Standardized Patients Now Virtually a Reality" Poster of the ISMAR 2004 conference, Nov. 2 - 5, 2004 in Arlington, VA

#### **Activities:**

#### **Televised Presentations:**

- WVEC News 3 (Norfolk, VA). Virtual Pathology Stethoscope project.
- WAVY News 10 (Norfolk, VA). Combat Surgery project.
- WVEC News 3 (Norfolk, VA). Virtual Environments for Training project.
- The Discovery Channel. "Ultimate Guide to Mummies". Presented the research work done in interaction of volume rendering using the visible human data from the National Library of Medicine.
- PBS. Scientific American Frontiers. "Journey to Mars". Presented the research work done for using Virtual Environments for astronaut training.
- BBC. Tomorrow's World. "The Hotel Room of the Future" Presented research work done in visualizing architectural spaces in virtual environments.

#### **Press Publications:**

- Mechanical Engineering Magazine featured article "Virtual OR" Nov 2006 issue
- Virginia Business Magazine cover story "Sim City". May 2006 issue pp. 10-16

## **Book Chapters:**

- Sokolowski, John A., and Hector M. Garcia. "The Significance of Modeling and Visualization." *The Digital Patient: Advancing Healthcare, Research, and Education* (2015): 33-48.

## **Patents:**

### **ODU patent Reference #**

### **INVENTION**

04009	System, method and medium for simulating normal and abnormal medical conditions
04013	Surgical simulator to support wound debridement
05005	Portable Haptics Display