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Education

Ph.D., Electronic Visualization Laboratory (EVL) and the Department of Computer Science, University of Illinois at Chicago (UIC), Chicago, IL, 2004–present
Concentrating on research interests in virtual reality (VR), data visualization, and real-time 3D graphics. Working on my dissertation "Planetary-scale Terrain Composition," a scalable terrain data visualization that homogenizes elevation and surface-mapped data handling as real-time image manipulation using GPU-based fragment shading. Implemented in C++ using OpenGL, SDL, and TCP sockets, the renderer supports stereoscopic VR and cluster-based rendering for ultra-high-resolution tiled displays. This work is supported by the NSF-funded OptIPuter project and the Adler Planetarium.

M.S., Computer Science, University of Iowa, Iowa City, IA, 1997–2001
Thesis was "A Framework for Tele-Immersive Application Development," for which I developed a set of network-synchronized objects and 3D GUI widgets used to develop colaborative virtual reality applications for the CAVE and Immersadesk.

B.S., Computer Science and Mathematics, University of Iowa, 1993–1997

Professional Experience

Research Assistant, EVL, UIC, 2004–present
Continued to develop "Electro," a scripting system for cross-platform application development targeting VR systems, tiled displays, and desktop systems. Electro has been used in UIC's Video Game Development course, exhibits at the Adler Planetarium and Astronomy Museum, and several projects and prototypes at EVL. Assisted in the development of the Varrier autostereoscopic system and the IDesk4 stereo display. Acted as visualization consultant to the Space Visualization Lab at the Adler Planetarium, supporting EVL technology including the tiled and GeoWall display systems and visualization software.

Open Source Software Developer, 2000–present
- *Electro*, a cross-platform scripting system for the development of interactive 3D applications for cluster-driven tiled displays and virtual reality devices.
- *Neverball*, a highly-rated cross-platform rolling ball game using a custom physics simulator and OpenGL renderer.
- *Neverputt*, a 3D miniature golf game based on the Neverball game engine.
- *GL Scheme*, a complete implementation of the OpenGL API for the Scheme programming language, adopted in the official distribution of PLT Scheme.

Research Associate, Center for Advanced Engineering Environments, Old Dominion University and NASA Langley Research Center, Hampton, VA., 2001–2004
Assisted in the design, implementation, and programming of two stereoscopic virtual reality devices, one using a spherical projection, the other blending multiple projectors. Worked with multi-modal interfaces to virtual environments, creating a dynamic PDA-based control interface. Developed custom structural visualization code for NASA Langley. Build a Beowulf cluster for structural analysis research and photo-real rendering.

Research Assistant and Teaching Assistant, University of Iowa, 1993–2001
Research Assistant for the Advanced Research Computing Service (1998–2001). Developed applications for real-time 3D visualization. Designed and implemented a reusable framework for VR development for the CAVE. Presented a regular course on parallel programming. *Research Assistant* for the Department of Computer Science (CS) (1997–2000). Performed research in language processing. Designed and implemented a formal language for semantic specification for programming language translation and compiler construction. *Teaching Assistant* in CS (1999–2000). Assisted a professor with a graduate course on parallel programming. *Research Assistant* in CS (1994–1995). Implemented an object-oriented system for testing and comparing parallel discrete event simulation methods. *Research Assistant* in the Department of Physics and Astronomy (1993–1994). Implemented a simulation to model the impact of the management of the Coralville Dam on flooding in Iowa City.

Professional Activities

Presentation of "Real-time Digital Dome Rendering Techniques and Technologies" at the International Planetarium Society 2008 Conference, Chicago, IL, July 2008.

Demonstration of the Planetary Scale Terrain Composition algorithm at SC'07, Reno, NV, November 2007. Installation used the "OptIPortable," a portable tiled-display system developed at California Institute for Telecommunications and Information Technology (Calit2) at UCSD.

Presentation of "A GPU Sub-pixel Algorithm for Autostereoscopic Virtual Reality" at IEEE VR 2007, Charlotte, NC, March 2007.

Demonstration of Personal Varrier autostereoscopic display, developed by UIC/EVL, at SC'05, Seattle, WA, November 2005

Demonstration of Personal Varrier at the iGrid 2005 Workshop, UCSD, September 2005.

Selected Publications (See Publications Addendum for complete list)

Kooima, R., Peterka, T., Girado, J., Ge, J., Sandin, D., DeFanti, T., "A GPU Sub-pixel Algorithm for Autostereoscopic Virtual Reality" in the *Proceedings of IEEE VR 2007*, Charlotte, NC, March 10-14, 2007.

Peterka, T., Kooima, R., Girado, J., Ge, J., Sandin, D., Johnson, A., Leigh, J., Schulze, J., DeFanti, T., "Dynallax: Solid State Dynamic Parallax Barrier Autostereoscopic VR Display" In *IEEE Transactions on Visualization and Computer Graphics*, vol. 14, no. 3, pp. 487-499, May-June 2008.

Peterka, T., Kooima, R., Girado, J., Ge, J., Sandin, D., DeFanti, T., "Evolution of the Varrier autostereoscopic VR display: 2001-2007" in *Proceedings of SPIE*, 2007

Peterka, T., Sandin, D., Ge, J., Girado, J., Kooima, R., Leigh, J., Johnson, A., Thiebaux, M., DeFanti, T., "Personal Varrier: Autostereoscopic Virtual Reality for Distributed Scientific Visualization" in the *International Journal of Future Generation Computer Systems*, Elsevier, 22.8 (2006), pp. 976-983.

Memberships

Member, ACM (2007–present)
Member, IEEE Computer Society (2007–present)