

BYUNGIL (BRENT) JEONG

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EDUCATION

Electronic Visualization Laboratory, Dept. of Computer Science, University of Illinois at Chicago

Ph.D. in Computer Science, August 2003 – present

- Thesis: “Visualcasting: Scalable Real-Time Image Distribution in Ultra-High Resolution Display Environments” implemented a high-performance image multicasting service for scalable heterogeneous tiled displays using high-performance PC clusters, 10Gbps networking, and various software tools (C++, OpenGL, SDL, Pthread, TCP/IP and UDP sockets). Visualcasting is based on the Scalable Adaptive Graphics Environment (SAGE), a scalable graphics architecture supporting scientific visualization and collaboration on ultra-high-resolution tiled displays. SAGE Visualcasting has supported international collaboration among partners in the OptIPuter project (a major NSF-funded initiative to design advanced cyberinfrastructure for data-intensive science using optical networks).
- Course Works: GPA 4.0/4.0
GPU Programming, Computer Graphics, Scientific Visualization, Virtual Reality, Video Game Design and Programming, Networked Operating System, Data Mining and Text Mining

School of Electrical Engineering, Seoul National University, Korea

Master in Electrical Engineering, March 1997- February 1999

- Thesis: “Hardware-Software Partitioning and Scheduling for Reconfigurable Architecture” presented an efficient heuristic algorithm of hardware-software partitioning and scheduling for embedded system design including run-time reconfigurable Field Programmable Gate Arrays (FPGA).

B.S. in Electrical Engineering, March 1993- February 1997

RESEARCH AND WORK EXPERIENCE

Electronic Visualization Laboratory (EVL), University of Illinois at Chicago (Aug 2003 - present)

Main developer of Scalable Adaptive Graphics Environment (SAGE): <http://www.evl.uic.edu/cavern/sage>

- Designed and implemented SAGE’s high-performance graphics streaming architecture to support real-time streaming of extremely high-resolution graphics and video over high-speed networks from remote clusters to high-resolution tiled displays.
- Developed SAGE’s desktop manager that enables users to run and interact with multiple visualization applications on a tiled display and to freely move and resize application windows.
- Extended SAGE to support distance collaboration with multiple endpoints by implementing Visualcasting.
- Extensive collaboration experience with SAGE project members at EVL and with international collaborators at University of California, San Diego, University of Michigan, SARA Computing & Networking Services in The Netherlands, NTT in Japan, and Korea Institute of Science and Technology Information (KISTI) in Korea.

Imaging Media Research Center, Korea Institute of Science and Technology (Nov 2001 - Dec 2002)

- Developed an image processing hardware using a FPGA and DDR (double-data-rate) RAMs. It pre-processed input images to make them look correct when projected on a cylindrical screen in an immersive display environment.

SELECTED PUBLICATIONS (See *Publication Addendum* for full list)

- [1] Jeong, B., Renambot, L., Jagodic, R., Singh, R., Aguilera, J., Johnson, A., and Leigh, J., "High-Performance Dynamic Graphics Streaming for Scalable Adaptive Graphics Environment," ACM/IEEE Supercomputing, Nov. 2006.
- [2] Renambot, L., Jeong, B., Jagodic, R., Johnson, A., Aguilera, J., and Leigh, J., "Collaborative Visualization using High-Resolution Tiled Displays," CHI 06 Workshop on Information Visualization and Interaction Techniques for Collaboration Across Multiple Displays, Apr. 2006.
- [3] Jeong, B., Jagodic, R., Renambot, L., Singh, R., Johnson, A., and Leigh, J., "Scalable Graphics Architecture for High-Resolution Displays," IEEE Information Visualization Workshop on Using Large, High-Resolution Displays for Information Visualization, Oct. 2005.
- [4] Singh, R., Jeong, B., Renambot, L., Johnson, A., and Leigh, J., "TeraVision: a Distributed, Scalable, High resolution Graphics Streaming System," in Proceedings of IEEE Cluster, Sep. 2004.

PROFESSIONAL ACTIVITIES

"Global Lambda Visualization Facility", iGrid 2005:

Demonstrated simultaneous real-time streaming of a wide variety of high-resolution graphics from Korea (over KREONet2), The Netherlands (over SURFNet), and Chicago (over National LambdaRail) to a 100-Megapixel high-resolution tiled display in San Diego. 10Gb/s was allocated for the demonstration, which ran for a total of 6 hours over 3 sessions. 9Gb/s of sustained throughput was achieved.

"Scalable Visualcasting", Supercomputing 2006 and 2007:

Demonstrated remote collaboration using Visualcasting and tiled displays. One remote site (EVL, Chicago) and three booths in the convention (EVL/SDSC, SARA/Dutch consortium, and University of Michigan/Research channel) joined this demonstration. The Visualcasting service enabled participants to share their visualization applications on each other's tiled displays while seeing each other by HD camera live feed.

"Collaborative Visualization Architecture in Scalable Adaptive Graphics Environment", IBM Visualization and Graphics Student Symposium 2007:

Presentation about the graphics streaming architecture and capabilities of SAGE and Visualcasting.

PROFESSIONAL SKILLS

Languages and libraries: C, C++, Shell, OpenGL, GLSL, VTK, Open Inventor, SDL, MFC, SVN

System programming: TCP/IP and UDP sockets, Multi-thread, MPI, pipe, shared memory, semaphore, iovec, signal

MEMBERSHIPS

Student member, ACM (2005 - present) and IEEE (2006 - present)

EXTRACURRICULAR ACTIVITIES

President of young adult group at the Korean United Presbyterian Church (2005)

A bible study leader of young adult group at the Korean United Presbyterian Church (2005 - present)

PERSONAL

Hobbies: Bicycling, swimming, skiing, classic guitar playing, watching baseball

Languages: Korean, English

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Publication Addendum

JOURNAL PAPERS

- [1] Leigh, J., Renambot, L., Johnson, A., Jeong, B., et al., "The Global Lambda Visualization Facility: An International Ultra-High-Definition Wide-Area Visualization Collaboratory," *Future Generation Computer Systems*, Volume 22, Oct. 2006.
- [2] Singh, R., Schwarz, N., Taesombut, N., Lee, D., Jeong, B., et al., "Real-time Multi-scale Brain Data Acquisition, Assembly, and Analysis using an End to End OptIPuter," *Future Generation Computer Systems*, Volume 22, Oct. 2006.
- [3] Hirano, A., Renambot, L., Jeong, B., Leigh, J., Verlo, A., et al., "The First Functional Demonstration of Optical Virtual Concatenation as a Technique for Achieving Terabit Networking," *Future Generation Computer Systems*, Volume 22, Oct. 2006.

CONFERENCE PAPERS

- [1] Tsukishima, Y., Hirano, A., Nagatsu, N., Imajuku, W., Jinno, M., Hibino, Y., Takigawa, Y., Hagimoto, K., Wang, X., Renambot, L., Jeong, B., Leigh, J., DeFanti, T., Verlo, A., "Lambda Sharing Demonstration via Traffic-Driven Lambda-on-Demand," *Proceedings of the 33rd European Conference and Exhibition on Optical Communication (ECOC 2007)*, Sep. 2007.
- [2] Leigh, J., Johnson, A., Renambot, L., DeFanti, T., Brown, M., Jeong, B., Jagodic, R., Krumbholz, C., Svistula, D., Hur, H., Kooima, R., Peterka, T., Ge, J., Falk, C., "Emerging from the CAVE: Collaboration in Ultra High Resolution Environments," *Proceedings of the First International Symposium on Universal Communication*, Jun. 2007.
- [3] Venkataraman, S., Benger, W., Long, A., Jeong, B., Renambot, L., "Visualizing Hurricane Katrina: large data management, rendering and display challenges," *Proceedings of the 4th International Conference on Computer Graphics and Interactive Techniques in Australasia and Southeast Asia 2006*, Nov. 2006
- [4] Jeong, B., Renambot, L., Jagodic, R., Singh, R., Aguilera, J., Johnson, A., and Leigh, J., "High-Performance Dynamic Graphics Streaming for Scalable Adaptive Graphics Environment," *ACM/IEEE Supercomputing*, Nov. 2006.
- [5] Wang, X., Vishwanath, V., Jeong, B., Jagodic, R., He, E., Renambot, L., Johnson, A., and Leigh J., "LambdaBridge: A Scalable Architecture for Future Generation Terabit Applications," *Broadnets 2006 - Third International Conference on Broadband Communications, Networks, and Systems*, Oct. 2006.
- [6] Renambot, L., Jeong, B., Jagodic, R., Johnson, A., Aguilera, J., and Leigh, J., "Collaborative Visualization using High-Resolution Tiled Displays," *CHI 06 Workshop on Information Visualization and Interaction Techniques for Collaboration Across Multiple Displays*, Apr. 2006.
- [7] Tsukinama, Y., Hirano, A., Nagatsu, N., Ohara, T., Imajuku, W., Jinno, M., Takigawa, Y., Hagimoto, K., Renambot, L., Jeong, B., Leigh, J., DeFanti, T., Verlo, A., Winkler, L., "The First Application-Driven Lambda-on-Demand Field Trial over a US Nationwide Network," *Proceedings of OFC/NFOEC 2006 (Optical Fiber Communication/ National Fiber Optic Engineers Conference)*, Mar. 2006.
- [8] Jeong, B., Jagodic, R., Renambot, L., Singh, R., Johnson, A., and Leigh, J., "Scalable Graphics Architecture for High-Resolution Displays," *IEEE Information Visualization Workshop on Using Large, High-Resolution Displays for Information Visualization*, Oct. 2005.

- [9] Renambot, L., Rao, A., Singh, R., Jeong, B., et al., "SAGE: the Scalable Adaptive Graphics Environment," WACE 2004, Sep. 2004.
- [10] Singh, R., Jeong, B., Renambot, L., Johnson, A., and Leigh, J., "TeraVision: a Distributed, Scalable, High resolution Graphics Streaming System," IEEE Cluster, Sep. 2004.
- [11] Jeong, B., Yoo, S., Lee, S., and Choi, K, "Hardware-Software Co-synthesis for Run-time Incrementally Reconfigurable FPGAs", in Proceedings of the Asia South Pacific Design Automation Conference (ASPDAC), pp.169-174, Jan. 2000.
- [12] Jeong, B., Yoo, S., and Choi, K, "Exploiting early partial reconfiguration of run-time reconfigurable FPGAs in embedded systems design", in Proceedings of the 1999 ACM/SIGDA Seventh International Symposium on Field Programmable Gate Arrays (FPGA '99), pp.247-250, Feb. 1999.