

Professional Interests

Systems and applications for *data intensive computing at large scale*, including computational databases, parallel and distributed systems, scalable I/O and indexing techniques for large multi-dimensional spatial datasets, data compression and visualization. In particular, I am interested in programming models, abstractions and supporting systems for these types of computation.

Education

Ph.D. Electrical and Computer Engineering,
Carnegie Mellon University, Pittsburgh PA, USA. Aug 2007.

Thesis: “*Methods for Querying Compressed Wavefields*”. I developed techniques to compress, index and query large wavefield datasets in their compressed representation, turning an I/O intensive problem into a massively parallel computational workload.

M.Sc. Electrical and Computer Engineering,
Carnegie Mellon University, Pittsburgh PA, USA. May 2000.

Thesis: “*Dv — A framework for remote visualization*”. I developed a library to create visual representations, like images or 3D models, of datasets stored at remote sites.

B.S. Computer Science (Ingeniero de Sistemas).
Universidad EAFIT, Medellín, Colombia. June 1996.

I graduated at the top of my class and throughout my studies I had the highest GPA in my class every term. Graduation Project: “*A Protocol for Communications in Distributed Virtual Environments*”. My graduation project served as the communication layer of a larger project intending to implement a prototype Distributed Virtual Reality system.

Professional Experience

Hewlett-Packard Laboratories. Palo Alto CA, USA. June 2000 – September 2000.

Intern Researcher: Designed and implemented a mechanism to aggregate the bandwidth of the long-range links of multiple personal devices.

Massachusetts Institute of Technology (MIT)/Center for Educational Computing Initiatives.
Boston MA, USA. August 1997 – July 1998.

Visiting Researcher: Developed a library to annotate, classify, and store multimedia objects. Designed and implemented a caching architecture for low bandwidth networks.

Universidad EAFIT, Proyecto Conexiones. Medellín, Colombia. January 1997 – July 1997.

Software Engineer: Ported to Java the user interface of the “*Pachamama*” educational software.

Universidad EAFIT, IT Department. Medellín, Colombia. June 1995 – January 1997

System and Network Administrator: Administered several Solaris / HP-UX / Linux / MS Windows machines and Cisco routers. Configured and installed numerous network services software for these environments.

Corporación Nacional de Ahorro y Vivienda (CONAVI). Medellín, Colombia. January 1995–June 1995.

EDP Auditor: Corporate network performance and security evaluation.

Publications

Michael Mesnier, Matthew Wachs, Julio López, Raja Sambasivan, James Hendricks and Gregory Ganger. “|| *TRACE – Parallel Trace Replay with Approximate Causal Events*”. In Proceedings of 5th Conference on File And Storage Technologies (FAST’07), San Jose, CA. February 2007.

Stratos Papadomanolakis, Anastassia Ailamaki, Julio López, Tiankai Tu, David R. O’Hallaron, Gerd Heber. “*Efficient query processing on unstructured tetrahedral meshes*”. In Proceedings of the ACM International Conference on Management Of Data (SIGMOD’2006), Chicago, IL. June 2006. pp. 551–562.

Eno Thereska, Brandon Salmon, John Strunk, Matthew Wachs, Michael Abd-El-Malek, Julio López, Gregory R. Ganger. “*Stardust: Tracking activity in a distributed storage system*”. In Proceedings of the Joint International Conference on Measurement and Modeling of Computer Systems (SIGMETRICS’2006), Saint-Malo, France. June 26th–30th 2006.

Julio López, David O’Hallaron and Tiankai Tu. “*Big Wins with a Small Application-Aware Cache*”. In Proceedings of Supercomputing 2004 (SC’2004), Pittsburgh, PA. November 2004.

Volkan Akcelik, Jacobo Bielak, George Biros, Ioannis Epanomeritakis, Antonio Fernandez, Omar Ghattas, Eui Joong Kim, Julio Lopez, David O’Hallaron, Tiankai Tu and John Urbanic. “*High-Resolution Forward and Inverse Earthquake Modeling on Terasacale Computers*”. In Proceedings of the SuperComputing Conference (SC’2003), Phoenix, AZ, 2003.

Tiankai Tu, David O’Hallaron and Julio López, “*Etree — a database-oriented method for generating large octree meshes*”. In Proceedings of the 11th International Meshing Roundtable (IMR-11), Ithaca, NY. September 2002, pp. 127–138.

Julio López and David O’Hallaron “*Evaluation of a resource selection mechanism for complex network services*”. In Proceedings of the 10th symposium on High Performance Distributed Computing (HPDC-10), San Francisco, CA, USA. August 2001.

Puneet Sharma, Sung-Ju Lee, Jack Brassil and Julio López. “*Dynamic Link Striping: Breaking the WAN Bandwidth Barrier in Piconets*”. In Proceedings of the 11th IEEE Workshop on Local and Metropolitan Area Networks, Boulder, CO, USA. March 2001.

Julio López and David O’Hallaron. “*Support for interactive heavyweight services*”. Technical Report CMU-CS-01-104, School of Computer Science, Carnegie Mellon University, February, 2001.

Julio López and David O’Hallaron. “*Run-time support for adaptive heavyweight services*” In Proceedings of the 5th Workshop on Languages, Compilers and Run-time systems (LCR 2000), May 2000, Vol 1915 of Springer Verlag Lecture Notes in Computer Science, Rochester, NY. pp. 221–234.

Julio López and Edward Hogan. “*Jiffy: A Lightweight Jini File System*”. In Proceedings of 2nd CMU Student Symposium on Computer Systems (SOCS-2), Oct 1999, Pittsburgh, PA.

Julio López, Martin Aeschlimann, Peter Dinda, Bruce Lowekamp, Loukas Kallivokas and David O’Hallaron. “*Preliminary Report on the Design of a Framework for Distributed Visualization*”. Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA’99), June 1999, Las Vegas, NV. pp. 1833–1839.

Rabih Zbib, Saadeddine Mneimneh, Julio López, V. Judson Harward and Richard Rabbat. “*The TRIERARCH Trigger Architecture*”. In Proceedings of the Third Annual Federated Laboratory Symposium on Advanced Telecommunications / Information Distribution Research Program, February 1999, College Park, MD. pp. 267–271.

Judson Harward, Julio López, Saadeddine Mneimneh, Richard Rabbat, Rabih Zbib. “*An improved Hierarchical Caching Architecture for Low Bandwidth Networks*”. In ARL Federated Laboratory Symposium. 1998, College Park, Maryland, USA.

Teaching Experience

Carnegie Mellon University, Pittsburgh, PA

- Teaching assistant, 15-441 Computer Network. Fall 2002
- Teaching assistant, 18-845 Internet services. Spring 2001.
- Teaching assistant, Principles of the Internet. Summer 1999.

Universidad EAFIT, Medellín, Colombia.

- Adjunct Instructor for the Introduction to Computer Networks course. July 1996 - June 1997.
- Teaching assistant, Algorithms. Spring 1993.

Honors

Winner 2003 Gordon Bell Award for Special Achievement (Along with the members of CMU’s Quake project). The milestone calculations for the award included:

- The generation of a record unstructured hex mesh (3.7 billion elements, 4 billion nodes)
- The largest unstructured mesh wave propagation simulation (900 million elements, 3.2 billion DOF)
- The largest acoustic wave propagation inverse problem (17 million inversion parameters, 70 billion total unknowns)
- The largest elastic wave propagation inverse problem (275,000 inversion parameters, something like a billion total unknowns).

My undergraduate university grants every semester a scholarship to the student with the highest GPA for that semester among all the students the entire program. I won 2 of those Scholarships in 1991 and 1992.

First place in the Mathematics Contest for High School Students organized by Universidad EAFIT in 1990.

Finalist in the 4th National Mathematics Contest in 1989.

Third place in the 2nd and 3rd State-wide Mathematics Contest in 1985 and 1987.

Programming Languages and Technologies

C/C++, Java, Perl, SQL, SH Shell scripting, Pascal.

Programming Platforms: Unix / Linux / Solaris / Digital OSF / Cray XT3 Catamount OS.

Numerical and Matrix libraries: VxL, BLAS / LAPACK / ScaLAPACK, GNU Scientific Library (GSL), Automatically Tuned Linear Algebra Subroutines (ATLAS). Visualization Toolkit (VTK), Insight Registration and Segmentation Toolkit (ITK). Hierarchical Data Format (HDF5), Message Passing Interface (MPI), POSIX Threads.

Professional Affiliations

- IEEE: Institute of Electrical and Electronics Engineers.
- ACM: Association of Computing Machinery.

Miscellaneous

Languages: Proficient English; native Spanish.

I implemented the parallel I/O system for the CMU Quake ground-motion simulation numerical solver. This code runs on super computers with thousands of processors.

Since October 2004 to August 2007, I was in charge of setting up, maintaining and administering the computing and storage infrastructure for our research group (CMU Quake project and Computational Databases System project).

In May 2006, along with two other CMU graduate students, we created a tennis club for the campus community. We have a mailing list with more than 150 players from the community and have organized competition events.

In the Spring of 1999 I attended a workshop, organized by the CMU's Office of International Education (OIE) and given by the Internal Revenue Service (IRS), on tax issues for foreign students. Then I volunteered to provide advice to other international students in the information sessions organized by the OIE.