Francisco D. Igual

CONTACT INFORMATION

Facultad de Ciencias Físicas. Despacho 223
Dept. Arquitectura de Computadores y Automática
Universidad Complutense de Madrid, Spain

mobile: +34 622 020 905
office: +34 91 394 4394
e-mail: figual@fdi.ucm.es

RESEARCH INTERESTS

Dense linear algebra library development, High performance computing, Hardware accelerators, GPUs, DSPs.

EDUCATION

University Jaume I, Castellón, Spain

Doctor of Philosophy in Computer Science   **May 2011**
- Advisors: Professors Gregorio Quintana-Ortí and Rafael Mayo Gual

University Jaume I, Castellón, Spain

Master of Science in Computer Science   **June 2007**
- Advisor: Professor Enrique Quintana-Ortí

University Jaume I, Castellón, Spain

Bachelor of Science in Computer Science   **June 2006**
- Advisor: Professor Enrique Quintana-Ortí

SELECTED JOURNAL PUBLICATIONS

Marco Antonelli, Francisco D. Igual, Francisco Ramos and Vicente J. Traver "Speeding up the log-polar transform with inexpensive parallel hardware: Graphics units and multi-core architectures.". *Journal of Real-Time Image Processing. To appear, 2012.*

Jose Aliaga, Paolo Bientinesi, Davor Davidovic, Edoardo Di Napoli, Francisco D. Igual and Enrique S. Quintana-Orti "Solving Dense Generalized Eigenproblems on Multi-Threaded Architectures". *Applied Mathematics and Computation, Volume 218, pp. 11279-11289, 2012.*

Francisco D. Igual, Ernie Chan, Enrique S Quintana-Orti, Gregorio Quintana-Orti, Robert A van de Geijn, Field G van Zee "The FLAME Approach: From Dense Linear Algebra Algorithms to High-Performance Multi-Accelerator Implementations". *Journal of Parallel and Distributed Computing* (In press).

Gregorio Quintana-Orti, Francisco D. Igual, Mercedes Marques, Enrique Quintana-Orti, and Robert van de Geijn "A Run-Time System for Programming Out-of-Core Matrix Algorithms-by-Tiles on Multithreaded Architectures". *ACM Transactions on Mathematical Software* Volume 38, Number 4, Article 25.

Francisco D. Igual, Gregorio Quintana-Orti, and Robert van de Geijn "Scheduling Algorithms-by-blocks on Small Clusters". *Concurrency and Computation: Practice and Experience* (In press).

P. Bientinesi, F. Igual, D. Kressner, M. Petschow, E. S. Quintana. "Condensed forms for the symmetric eigenvalue problem on multi-threaded architectures". *Concurrency and Computation: Practice & Experience*, Vol. 23(7), pp. 694-707, 2011.

F. Igual, R. Mayo, T. Hartley, U. Catalyurek, A. Ruiz, M. Ujaldón. "Color and Texture Analysis on Emerging Parallel Architectures". *Journal High Performance Computing Applications*, Vol. 25, No. 4, pp. 404-427, 2011.

E. Ayguade, R. M. Badia, P. Bellens, D. Cabrera, A. Duran, R. Ferrer, M. Gonzalez, F. Igual, D. Jimenez, J. Labarta, L. Martinell, X. Martorell, R. Mayo, Jose M. Perez, E. S. Quintana. "Extending OpenMP to survive the heterogeneous multi-core era". *Int. J. of Parallel Programming*, Vol. 38(5-6), pp. 440-459, 2010.

S. Barrachina, M. Castillo, F. Igual, R. Mayo, E. S. Quintana, G. Quintana. "Exploiting the capabilities of modern GPUs for dense matrix computations". *Concurrency and Computation: Practice & Experience*, Vol. 21, pp. 2457-2477, 2009.

SELECTED CONFERENCE PUBLICATIONS

Francisco D. Igual, Murtaza Ali, Arnon Friedmann, Eric Stotzer, Timothy Wentz, Robert A. van de Geijn. "Unleashing the High-performance and Low-power of Multi-Core DSPs for General-purpose HPC". In *SC12. International Conference on High-Performance Computing, Networking and Storage. Salt Lake City, USA.* November 10-16, 2012.

E. Ayguade, R. M. Badia, F. D. Igual, J. Labarta, R. Mayo, E. S. Quintana. "An extension of the StarSs programming model for platforms with multiple GPUs". In *Lecture Notes in Computer*

Science 5704, Euro-Par 2009, pp. 851-862,(Eds. H. Sips, D. Epema, H.-X. Lin). Delft (Holanda). 2009.

G. Quintana, F. D. Igual, E. S. Quintana, R. van de Geijn. "Solving dense linear algebra problems on platforms with multiple hardware accelerators". In *14th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming – PPoPP 2009*, pp. 121-129. Raleigh (EE.UU.). 2009.

S. Barrachina, M. Castillo, F. Igual, R. Mayo, E. S. Quintana. "Solving dense linear systems on graphics processors". In *Lecture Notes in Computer Science 5168, Euro-Par 2008,(Eds. E. Luque, T. Margalef, D. Bentez,) pp. 739-748.* Las Palmas de Gran Canaria (Spain). 2008.

T. Hartley, U. Catalyurek, A. Ruiz, F. Igual, R. Mayo, M. Ujaldon. "Biomedical Image Analysis on a Cooperative Cluster of GPUs and Multicores". In *22nd ACM International Conference on Supercomputing. Island of Kos, Greece.* June 7-12, 2008.

PROFESSIONAL
EXPERIENCE

University Complutense, Madrid, Spain

Researcher   **March 2012 – Present**

Designing and developing accelerated solutions for dense linear algebra operations and image processing routines on low-power parallel architectures, including DSP and ARM, collaborating with the FLAME group at UT Austin.

Texas Advanced Computing Center, Austin, TX

Postdoctoral researcher   **September 2011 – March 2012**

Supervised by Dr. Victor Eijkhout and Prof. Robert van de Giejn, developing libraries for dense linear algebra operations on emerging architectures, including novel multi-core Digital Signal Processors by Texas Instruments.

University Jaume I, Castellón, Spain

Researcher. Ph.D. student   **September 2006 – August 2011**

Supervised by Prof. Enrique Quintana-Ortí, designing and developing accelerated solutions for dense linear algebra operations on emerging parallel architectures, including multi-GPU architectures and clusters of GPUs, collaborating with the FLAME group at UT Austin.

REFERENCES

Professor Robert A. van de Geijn
Professor
The University of Texas at Austin
Austin, TX
phone: *available on request*
e-mail: *available on request*

Dr Paolo Bientinesi
Junior Research Leader
AICES, RTWH Aachen
Aachen, Germany
phone: *available on request*
e-mail: *available on request*

Professor Enrique Quintana-Ortí
Professor
University Jaume I de Castellón
Castellón, Spain
phone: *available on request*
e-mail: *available on request*

Dr Gregorio Quintana-Ortí
Associate Professor
University Jaume I de Castellón
Castellón, Spain
phone: *available on request*
e-mail: *available on request*