INNOVATIVE COMPUTING LABORATORY NEWSLETTER

JULY 2010

Webinar on MAGMA

Stan Tomov and Jack conducted a 1.5 hour NVIDIA webinar on June 14 titled **An Introduction to the MAGMA project** - acceleration of dense linear algebra. The video can be downloaded from the **NVIDIA website** (216 MB).

High Performance Computing Blog

Looking for a blog about what's happening in the supercomputing community? Check out HPCWire's *HPC Community Voices*, especially the **latest entry** by Charlie Catlett where he recaps the International Advanced Research Workshop on High Performance Computing at HPC 2010 in Italy last month. Be sure and check out the singing adaptation of the Rolling Stones' "You Can't Always Get What You Want" at the end of the blog entry.

Interview with Jack about the rise of GPUs in supercomputing

On June 1st, **CNET News interviewed Jack** about the use of GPUs in the next generation of supercomputers.

ICL's own Heike Jagode Conducts Interviews at ISC 2010

Heike turned reporter for a short time at ISC 2010 in Hamburg Germany May 31st – June 3rd where she interviewed several key conference attendees. See her interviews at **ISC's Video Blog site**.

International Exascale Software Project (IESP) in the news

HPCWire recently interviewed Jack about the new IESP effort, including the delivery of the first technology Roadmap, which outlines several key elements for making the transition to Exascale computing.

RECENT PAPERS

Agullo, E., Giraud, L., Guermouche, A., Haidar, A., Roman, J. **Towards a Complexity Analysis of Sparse Hybrid Linear Solvers**, *PARA 2010*, Reykjavik Iceland, June 6-9. **PDF**

Agullo, E., Giraud, L., Guermouche, A., Haidar, A., Roman, J., Lee-Tin-Yen, Y. **MaPHYS or the development of a parallel algebraic domain decomposition solver in the course of the Solstice project**, *Sparse Days 2010 Meeting at CERFACS*, June 15-17. **PDF**

Bernholc, J., Hodak, M., Lu, W., Moore, S., Tomov, S. **Scalability Study of a Quantum Simulation Code**, *PARA 2010*, University of Iceland, Reykjavik, June 6-9. **PDF**

Bosilca, G., Bouteiller, A., Herault, T., Lemarinier, P., Dongarra, J. **Dodging the Cost of Unavoidable Memory Copies in Message Logging Protocols**, *Proceedings of EuroMPI 2010*, Jack Dongarra, Michael Resch, Rainer Keller, Edgar Gabriel, Eds. Stuttgart, Germany, Springer, September, 2010. **PDF**

Bosilca, G., Coti, C., Herault, T., Lemarinier, P., Dongarra, J. **Constructing Resiliant Communication Infrastructure for Runtime Environments in Advances in Parallel Computing**, Barbara Chapman, Frédéric Desprez, Gerhard R. Joubert, Alain Lichnewsky, Frans Peters, Thierry Priol, Eds. Vol. 19, 2010, pp. 441-451. ISBN 978-1-60750-529-7. **URL**

Dongarra, J. **LINPACK on Future Manycore and GPU Based Systems**, *PARA 2010*, Reykjavik Iceland, June 6-9.

Luszczek, P., Dongarra, J. **Analysis of Various Scalar, Vector, and Parallel Implementations of RandomAccess**, *Innovative Computing Laboratory (ICL) Technical Report*, ICL-UT-10-03, June, 2010. **PDF**

Ma, T., Bouteiller, A., Bosicla, G., Dongarra, J. **Locality and Topology aware Intra-node Communication Among Multicore CPUs**, *Proceedings of the 17th EuroMPI conference*, Stuttgart, Germany, LNCS, September, 2010. **PDF**

RECENT CONFERENCES

MAY 30 - JUN 3 Hamburg, Germany
ISC '10 / Jack, Jakub, Heike

JUN 2 - 4 Aussois, French Alps.
3rd 'Scheduling in Aussois' Workshop / George
Download the talks **here**

JUN 6-9 Reykjavik, Iceland
Para 2010: State of the Art in Scientific and Parallel Computing / George, Jack, Shirley
Jack gave the keynote titled **Impact of Architecture and Technology for Extreme Scale on Software and Algorithm Design**

Continued on page 3

INTERVIEW

Azzam Haidar

Post Doctoral Research Associate

As one of ICL's newer hires, what are you working on in the group?

My research interests are in numerical linear algebra. At ICL, I have been mostly involved in the Parallel Linear Algebra for Scalable Multi-core Architectures (PLASMA) project. At first, I was involved in the study of some tuning parameters and how they will improve the performance of the main factorization kernels in PLASMA. Moreover, I am interested in the improvement of Eigenvalue problem algorithms. I am also investigating, with the ICL team, new techniques that will provide a higher degree of parallelism for those algorithms. Such techniques should improve the execution time and might be good choices for multicore machines. Furthermore, I would like to implement the Eigensolvers on GPUs.

How did you learn about ICL and why did you decide to join us?

While I was at CERFACS, it was obvious and natural to hear about Jack's work and ICL. There is a longstanding relationship between Jack and CERFACS. It is also commonly known that ICL is one of the pioneer research groups in the HPC area and software development. Furthermore, last summer, I met Julien Langou who is a CERFACS and ICL alumnus and I discovered how enthusiastic he was (and is) about ICL. I immediately decided that this place is convenient for me to work.

Tell us a little about yourself like where you're from and your education/research background.

I am originally from Lebanon. I was born and grew up in Byblos, a small city located on the Mediterranean. It is the Phoenician city, and one of the oldest continuously inhabited cities in the world. In 2003, I received an MS engineering degree in Computer science and Telecommunications. Following graduation, I began working in the Electrical Engineering and Computer Science department at the university where I graduated. After that I was eager to continue studying, so I moved to France where, in 2005, I earned my second MS degree in Mathematics specializing in numerical analysis. This was at IRISA in Rennes in northwestern France. Then I went to Toulouse where I joined the CERFACS Lab for my PhD. Toulouse is located in the heart of southern France, between the Mediterranean and the Atlantic Ocean. For me, Toulouse was different from Rennes. It is larger and an active city to satisfy the taste nearly any lifestyle where you can be seduced by great cultural events, festival pleasure and for sure nice weather.

At CERFACS my work was on numerical linear algebra algorithms and parallel programming. More precisely, I was working on hybrid sparse linear solvers; those solvers rely on direct/iterative techniques to build a hybrid approach for massively parallel platforms. I received my PhD degree in 2008 and afterwards I started a post doc position at ENSEEIHT in Toulouse until I joined ICL in February.

What do you enjoy most about working at UT?

I really appreciate the working conditions at ICL. The work environment is great. Everything is well organized and managed so that we can really focus on our research. I like the fact that the problems we are dealing with are challenging and the software we develop are really widely used. The people are so friendly and competent. I also appreciate the fact that people here, like CERFACS, come from diverse backgrounds, which presents opportunities to discover and talk about all sorts of subjects. I'm pleased to be working with this group - I feel like home.

What are your hobbies or interests outside of work?

I like hiking, mountaineering, camping, and anything that involves nature and the outdoors. To be very close to the Smoky Mountains is wonderful. I also would like to practice other activities like playing tennis, riding my bike or going fishing.

On the other hand, I am a big fan of the restaurants; I am trying many of them...so many good places to eat.

If you could live and work anywhere in the world, where would it be and why?

That is difficult to answer. I don't know about a specific place. But in order to answer such a question, you have to think about life, family, hobbies, friends, work, and look beyond the surface to

RELEASES

HPCC 1.4.1

Version of 1.4.1 of the HPCC benchmark suite has been released, which contains several updates and corrections.

PAPI 4.1.0

Version 4.1.0 of PAPI is now available, which contains new platforms support and other updates.

PEOPLE

Brian Sheely has departed and returned to San Diego, California, where he will continue to work for the group over the next few months.

Congratulations to **Dan Terpstra**'s wife who recently received the Presidential Award for Excellence in Mathematics and Science Teaching, one of only 103 awarded across the nation for 2010. For more information, **see the article in the Oak Ridger**.

Shirley Moore returns full time to ICL after spending the last three years teaching gifted high school students in Chicago.

RECENT LUNCH TALKS

JUN 4 Stan
Matrix Algebra on GPU and Multicore Architectures PDF

JUN 11 Azzam
A Tile Divide-and-Conquer Algorithm for Symmetric Eigenvalue Problems PDF

JUN 18 Lou Gross
Computational Thinking, Models and Data: Comments from 30 Years of Effort at the Math/Biology Interface PDF

JUN 25 Jakub
GPU Acceleration for PLASMA PDF

UPCOMING LUNCH TALKS

JULY 2 Piotr

JULY 9 Dulceneia Becker from Brazil

JULY 16 Anthony

JULY 23 Vince

JULY 30 TBA

RECENT CONFERENCES Continued

JUN 12 - 13 Beijing, China
CUDA Center of Excellence 2010 / Hatem

JUN 14 GPU Computing Online Seminars
An Introduction to the MAGMA project - acceleration of dense linear algebra / Jack, Stan

JUN 14 - 16 San Jose, CA
MPI Forum - June 2010 / Thomas

JUN 16 ORNL
MAGMA - a New Generation of Linear Algebra Libraries for GPU and Multicore Architectures / Stan PDF

JUN 21 - 25 Cosenza - Italy
HPC 2010 Advanced Workshop / George

JUN 22 - 25 Berkeley, CA
VECPAR / Hatem PDF, Rajib

JUN 29 - 30 Princeton, NJ
DARPA Blackjack Characterization Meeting - AACE PI Meeting / Anthony, Dave, Piotr

JUL 1 Paris
SAFE-OS project review / Thomas

UPCOMING CONFERENCES

JUL 11 - 15 Chattanooga, TN
SciDAC 2010 / Shirley

JUL 12 - 15 Knoxville, TN
SAAHPC'10 / Heike, Piotr PDF

JUL 15 Knoxville, TN
SAAHPC'10 - MAGMA Tutorial by Stan, George, and Cédric Augonnet titled "Accelerating Linear Algebra on Heterogeneous Architectures of Multicore and GPUs using MAGMA and the DPLASMA and StarPU Schedulers"

DATES TO REMEMBER

JULY 5 Holiday (UT closed)

ICL RETREAT REMINDER

The ICL Retreat will once again be held in Townsend at the Highland Manor Inn. However, the dates are different than in years past. It will be Thursday and Friday, **August 12- 13**, which is the week before classes begin, so please mark your calendar.

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Available on-line at: **http://icl.cs.utk.edu/newsletter/**
Comments and suggestions can be sent to: **icl-news@eecs.utk.edu**