CENTER FOR COMPUTATION & TECHNOLOGY
Interdisciplinary | Innovative | Inventive

LOUISIANA STATE UNIVERSITY

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CCT Weekly October 14- October 20, 2012

[CCT Weekly, October 16, 2012](#)

Graph Computations Made Easier!

Several universities across the United States have come together to develop a new environment for graph-based applications, solving a critical need for researchers in science, engineering, and informatics.

Led by Indiana University, the "PXGL: Cyberinfrastructure for Scalable Graph Execution" project will include a parallel programming model for graph computations, a corresponding execution platform, a graph-optimized soft-core architecture, and a graph library. Louisiana State University is among the collaborators for the project, led by Hartmut Kaiser, team lead of the Center for Computation & Technology's (CCT) STE||AR group. Others include members from New Mexico State University and Sandia National Laboratories.

The importance, applications, and scale of data-centric computing have grown dramatically. The computational resource requirements for graph-based computations for large-scale applications are just as vast as for traditional compute-intensive science, thus there is a pressing need to expand the scope of high-performance computing to include graph-based computations. Problems plague graphic computations, however, because they are often completely data driven, have poor locality, and result in fine-grained data accesses, or a high ratio of data accesses to computation.

PXGL (*ParalleX Graphic Library*) is an integrated hardware and software framework for solving large-scale graph problems, enabling and facilitating efficient execution of dynamic graph applications on current terascale and petascale systems, as well as future exascale systems. PXGL will enable and fundamentally improve scalability and user productivity for graph-based applications.

In addition, the project will create an experimental processor core called ELVIS (Edge-Linked Vertices Information System) to provide a new compute model for solving graph problems. ELVIS will serve as a vehicle to test the hypothesized requirements of a computer system to efficiently perform graph computation. The teams hope the combination of a non-coherent global address space, multithreading, fine-grained synchronization, and lightweight active messages will lead to the creation of substantially simpler processor architectures capable of supporting graph-based information processing. ELVIS is a unique opportunity to rethink computing as the traditional building-blocks for computer architectures—heavyweight threads, cache coherency, and hardware speculation—are unsuited to graph-based analysis.

The four institutions the PXGL project brings together all have significant experience in particular areas related to large-scale graph processing, and together provide the unique set of capabilities necessary to successfully develop the entire hardware and software system. Development of the parallel graph components of this work will be primarily conducted by the Indiana University team. LSU will be in charge primarily of the HPX runtime development. New Mexico State University and Sandia National Laboratory will be the co-architects of the processor and memory hardware systems. The teams will work closely together to integrate their effort into PXGL and to collaborate with application developers.

This project is funded by the National Science Foundation. For more information on the LSU CCT STE||AR group, visit http://stellar.cct.lsu.edu/.

Pats on the Back:

Parampreet Singh and Peter Diener received an award from the John Templeton Foundation through the University of Chicago titled "Probing the genesis of spacetime using supercomputers." The award is for $251,959 for two years.

Lectures this Week:

TUESDAY --

There will be a Computational Mathematics Seminar Series lecture on ["A Balancing Domain Decomposition Method by Constraints for Raviart-Thomas Vector Fields"](#) by Duk-Soon Oh, LSU. This lecture will take place on Tuesday, October 16th at 3:30 PM in 338 Johnston Hall.

Please Note:

- ⯈ **2012 LSU Foundation Staff Outstanding Service Award**
  Nominations are now being accepted for the 2012 LSU Foundation Staff Outstanding Service Awards. Staff members from LSU, the LSU AgCenter, and the LSU Law Center are eligible. The nomination form and instructions can be found online by clicking here. The deadline for accepting nominations is Friday, Oct. 26, at 4 p.m., and should be turned in to Rachel Henry, LSU Office of the Chancellor, 156 Thomas Boyd Hall.

- ⯈ FY 2012-2013 Holiday Schedule:

- ⯈ November 22- November 23: Thanksgiving
- ⯈ December 24 thru January 1: Christmas & New Year's
- ⯈ Don't forget to turn in your leave slips to Andy Cox if you are planning on taking extra vacation days.

- ⯈ Prior approval is required for Special Meal Requests. Employees who make meal purchases without prior approvals may find that they must cover the cost of any monies spent for an unapproved event out of pocket. Dine-in restaurant meals are not allowed on LaCarte credit cards. Please contact Susie McGlone (susie@cct.lsu.edu) prior to any special meal with visitor(s) to file the appropriate request for approval. Prior approval could take up to two weeks, so please plan accordingly.

- ⯈ Please remember to send your news concerning grants, awards, conferences, or other pertinent information to CCT Event Coordinator Jennifer Fontenot at jennifer@cct.lsu.edu

- ⯈ Follow CCT with social media to access photos and see news, events or updated information. These pages are public; you do not need an account to view the information.

  - ⯈ [Facebook group](#) : LSU Center for Computation & Technology
  - ⯈ [Twitter](#) : LSUCCT
  - ⯈ [YouTube channel](#) : LSUCCT

Interest groups:

➤ **MAG (Mobile App-Art-Action Group)**: Everyone interested in the potential for Mobile Apps is invited to come and add their vision for these revolutionary devices.

➤ October 18th: Mobile Music Workshop: Pd on iOS (or Android)

> ➤ Developers, interface and graphic designers, composers, performers, and musicians are all invited to learn how to make a mobile device into an instrument. The following day will be our second App-a-thon where teams will create an instrument in an afternoon. Musicians, composers and performers will then take these instruments and speed-compose music for a concert just before Fall break. If you like music and mobile devices, you should be here.

➤ October 19th: Mobile Music App-a-thon! 338 Johnston Hall, Noon - 9:00 PM

➤ October 24th: Mobile Music Concert: 3:30 PM at Highland Coffee

➤ November 1st MAG Meet: topic to be announced, Johnston Hall 338, 4:30-6:00 PM

➤ **Weekly MAG Lab Time**- Fridays, 9:00 AM-Noon: MAG collaborative work time- 16 Johnston Hall

> ➤ Come, design, plot, scheme, dream, work on your mobile projects with people around to provide help, feedback, and encouragement.

➤ For more information visit: http://www.cct.lsu.edu/MAG

➤ Contact: Jesse Allison (jtallison@lsu.edu)

➤ **GPU**: meets weekly (Thursdays @ 12:30 pm in 338 Johnston) and encourages participation from anyone who would like to join in the discussions. Join the mailing list: lasigma-gpu@loni.org

> ➤ Contact: Zhifeng Yun (zyun@cct.lsu.edu)

Upcoming events:

October 16- 17: OpenACC GPU Programming Workshop

October 18-19: Mobile Music Workshop & App-a-thon

October 19-20: ACM ICPC South Central USA Regional Programming Contest

October 24: HPC Training: Introduction to Perl

October 31: HPC Training: Introduction to Python

November 10-16: SC12- Supercomputing Conference

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