Rahulkumar Gayatri

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Research Interest

To work in the area of developing efficient algorithms that make the optimum use of the available resources. To work on performance optimizations of benchmarks (tracing applications for performance bottlenecks and overcome them with elegant solutions). To work on challenging projects and be a part of the latest trending developments in the world of technology.

Education

Doctor of Philosophy (PhD) in Computer Science (2015)
Barcelona Supercomputing Center
Thesis Title - "Increasing Parallelism through Speculation in Task-Based Programming Model."
Web-page - http://www.bsc.es/

Master of Technology (2009)
Specialization in Computer Science.
Sri Sathya Sai University
Web-page - http://sssihl.edu.in/sssuniversity/Academics/DepartmentofMathemati Overview.aspx

Master of Science (2007)
Specialization in Computer Science.
Sri Sathya Sai University

Bachelor of Science (2005)
Specialization in Mathematics.
Sri Sathya Sai University

Publications

1] "Loop level speculation in a task based programming model."
http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=6799132&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D6799132
2] "Transactional access to shared memory in StarSs, a task based programming model."
http://link.springer.com/chapter/10.1007/978-3-642-32820-6_51#page-1
3] "Analysis of the overheads incurred due to speculation in a task based programming model."
http://research.ac.upc.edu/multiprog/papers/multiprog-2015-3.pdf
4] "TERAFLUX: Harnessing dataflow in next generation teradevices."
http://www.sciencedirect.com/science/article/pii/S0141933114000490

Projects

Doctoral Thesis
Research the idea of integrating Transactional Memory into a Parallel Programming Model and use the framework to synchronize the multiple threads of execution. This optimistic approach has been adopted to improve the performance and the efficiency of a parallel application.
Papers published in this project: papers [1],[2] and [3] .

StarSs
A task-based programming model to make parallel programming easier. It generates a task-dependency graph at runtime based on the data-flow principles. My contribution to the thesis was to introduce new directives to the compiler and provide the required runtime support for the synchronization of multiple threads.

Teraflux
Teraflux project proposes a set of programming model, compiler analysis and a scalable, reliable architecture that will be able to harness such large scale parallelism in an efficient way. My contribution to the project was to introduce STM-based concurrency to handle simultaneous access to shared memory.
Papers published in this project: paper [4].

MTech Thesis
An efficient Breadth First Search (BFS) implementation that exploits memory locality in the IBM's Cell.B.E architecture.
A poster presenting this work was published in the student research symposium of HiPC 2008, Banglore, India.

Professional Career

Doctoral student at Barcelona Supercomputing Center -
September, 2009 - Present day

Honors

Received a Pre-Doctoral scholarship, FI AGAUR grant, by Generalitat de Catalunya

Programming Languages and Models

Languages:	C,C++
Scripting:	Shell, LaTeX, Sed, awk, gnuplot
Programming Models:	StarSs, OpenMP, MPI, Software Transactional Memory (STM)
Operating Systems:	Microsoft Windows, Linux
Software:	Eclipse, Visual Studio 2010, GIT
Profiling Tools:	gdb, Valgrind

Languages

English, Hindi, Spanish.

References

Rosa Maria Badia, Project and group manager at Barcelona Supercomputing Center.
Relation: PhD supervisor, email: rosa.m.badia@bsc.es,
Web-page: http://personals.ac.upc.es/rosab/

Eduard Ayguad, Computer Sciences Department Associate Director at Barcelona Supercomputing Center.
Relation: PhD supervisor, email: eduard.ayguade@bsc.es,
Web-page: http://people.ac.upc.es/eduard/

Pieter Bellens, Senior researcher at Barcelona Supercomputing Center.
Relation: Present colleague, email: pbellens@gmail.com