BACHELOR THESIS REVIEW

Student *Grigoriy Tkachenko*
Project *Project PGA: Work-Efficent and Scalable Parallel Graph Algorithms*
Supervisor 1 *Mike Rainey, PhD in Computer Science, full-time researcher at INRIA-Rocquencourt*
Supervisor 2 *Arthur Charguéraud, PhD in Computer Science, full-time researcher at Inria Saclay, in the Toccata team*

Review:

Arthur Charguéraud and I followed the progress of Grigoriy as he undertook his master's project. The project began as an investigation of efficient multicore (shared-memory, parallel) solutions to the single-source shortest paths problem for weighted directed graphs. Later in the project, Grigoriy added to the project a study of the all-pairs shortest paths problem. As such, the project consists of two main results. The first result is a performance study comparing several implementations to the single-source shortest-paths problem. The study shows that no single algorithm under consideration performs best for all graph structures considered. The second result is study of a few solutions to the all-pairs shortest paths problem. Among these solutions is (to the best of my knowledge) a novel algorithm that is tuned for small-world graphs. The performance study shows promising results from this algorithm in particular. Overall, I feel that this work is solid and, with additional experimental work, could well result in a strong submission to a competitive research conference. It is particularly impressive that Grigoriy has not only mastered our research code base, that is, the pasl library, but has also integrated into his algorithms some of the advanced data structures for parallel graph processing that Arthur Charguéraud, Umut Acar, and I have recently developed as part of our research.

05/29/2015

Mike Rainey

Arthur Charguéraud