Project Title: Software Support for Better Utilization of the Shared-cache Architecture on Multi-core Systems
Investigator: Apan Qasem
Department: Computer Science
Project Summary:
Overall, the project was a success in terms of fostering collaboration, producing scholarly work, opening paths to future research, and creating opportunities for external funding. Interestingly, however, our research did not produce the outcome as outlined in the original proposal. In hindsight, our original proposed work was perhaps too ambitious given the time frame and the resources available to us.

Our proposed research set out to establish a heuristic for optimal locality and parallelism on multicore systems. But as we started exploring this relationship, it became evident that there were a myriad components influencing performance to be captured by a single model. Therefore, instead of trying to develop a catch-all heuristic that is unlikely to be very effective, we focused our time in exploring the different architectural components that were having an impact on the performance of the applications. Many of these factors were not previously examined closely by the research community and our research provided key insight into ways of exploiting them. Thus, although our research did not produce the promised model, it did open up opportunities for further research for our research group and the HPC community as a whole.

This research produced one conference paper (HPCC). A Journal paper is in preparation. The student working on this project successfully defended his masters thesis. We submitted a proposal based on this work which led to an IBM Faculty Award for myself. We cited this work in a grant proposal to DOE, which they have agreed to fund. We are currently building on this work in collaboration with IBM, UTSA and the Industrial Engineering Department at Texas State.

Publications:
Michael Jason Cade and Apan Qasem, "Balancing Data Locality and Parallelism on Shared-cache Multi-core Systems", In Proceedings of 11th IEEE International Conference on High Performance Computing and Communications (HPCC09), June 2009.

Michael Jason Cade, "Balancing Data Locality and Parallelism for Improved Application Performance on Multi-core Platforms", Master Thesis, Computer Science Department, Texas State University, Dec 2008

External Grants:
IBM Faculty Award 2008

Student Number: 1