

*Faculty of Engineering and Natural Sciences
Seminar*

Friday, May 03, 2013, 11:30, 405 Hall

**Developing High-Performance Libraries for
Scientific Computing**

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Abstract

High performance computing in the realm of scientific applications constitutes a landscape in which computer engineers have to solve several critical questions regarding application, programming model and hardware. Within this talk, the focus will be on dense linear algebra routines which is intended to execute on standard general purpose, digital signal and graphics processors utilizing hardware mechanisms for SIMD operations and multithreading. Due to its simple and direct mapping to hardware and zero-overhead abstraction mechanisms, the choice of the programming language is the latest standard of C++ and the Open Computing Language. Featuring multiple programming paradigms, amongst others generic programming, C++ accompanied with the OpenCL standard enables the design of efficient libraries which target high performance computing for scientific applications. In case of dense linear algebra routines, several optimization parameters must be tuned to approach peak performance of processors. The main discussion will be on the design of such libraries for multidimensional arrays.

Biography

Cem Savas Bassoy is a research associate in the Institute of Computer Technology at the Hamburg University of Technology. Before joining the institute, he worked at the European Technology Center for Sony Germany, in the field of video and image processing. After receiving his BSc and MSc degrees in fuzzy logic and image processing systems, he participated in the research of fast image reconstructions and high-performance computing for new tomographic imaging technique at Philips Research Hamburg. Besides his research activities, he has been giving seminars and lectures in the field of reconfigurable and parallel computing, compiler design and C/C++ programming. He is currently finishing his dissertation on high performance and scientific computing for heterogeneous systems.

