Computational Challenges in Medical Image Processing
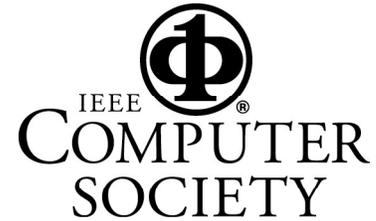
Christophe Chefd'hotel

Image processing algorithms play an increasing role in the analysis of medical images, with applications ranging from motion compensation to automatic detection, labeling and quantification of organs and lesions. While research has been very active in this field and significant advances have been made in the development of image segmentation and registration algorithms, the question of their practical implementation in a clinical workflow is often overlooked. Algorithm complexity, data size (in particular with volumetric images produced by modern acquisition modalities), as well as robustness and speed requirements pose significant computational challenges.

In this presentation, we will discuss how we can address some of these issues through careful algorithm design and by taking advantage of parallel processing architectures, such as multi-core systems and GPUs. We will illustrate this approach with three case studies. In particular, we will describe the design and implementation of a semi-automatic multi-label segmentation algorithm, an atlas-based image labeling system, and a motion correction algorithm for liver perfusion studies.

Christophe Chefd'hotel is a research scientist at Siemens Corporate Research, Princeton, NJ. He is a graduate from Ecole Supérieure d'Informatique-Electronique-Automatique, Paris, France, with a master's degree in Computer Science and Electrical Engineering. He also received a PhD in Applied Mathematics from Ecole Normale Supérieure de Cachan. For the past five years, his research focus has been the design and implementation of image analysis algorithms for clinical applications.

Date:	Thursday, February 21, 2008, 8:00 pm. (Refreshments and networking at 7:30 pm.)
Place:	Sarnoff Corp., Routes 1 and 571, Princeton, NJ
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On-line info:	**http://www.acm.org/chapters/princetonacm**

All ACM / IEEE-CS meetings are open to the public. Students and their parents are welcome. There is no admission charge, and refreshments are served.

A pre-meeting dinner with the speaker is held at 6:00 p.m. at Ruby Tuesday's Restaurant on Route 1. Please send email to **princetonacm@acm.org** in advance if you plan to attend the dinner.