

The American University of Beirut

**The Center for Advanced Mathematical Sciences (CAMS)
and
The Computer Science Department**

Invite you to a set of two lectures

on

GPU Programming

by

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In a two-part series of lectures exploring the various techniques used to exploit the inherent parallelism available within graphics processors to expedite general-purpose computations:

Lecture 1: Mon 6 Nov, 3:00- 4:30 PM

This lecture will introduce the graphics processor pipeline and provide a comparison between the conventional CPU programming model and that used for graphics programming, discussing the limitations of current-generation graphics hardware. Practical examples will be provided to demonstrate data-parallel computation using graphics shader programs with the OpenGL interface and to explain the mapping of various constructs familiar to CPU developers. These examples aim to illustrate the steps involved in setting up the environment, initializing the graphics components, transferring information to and from the graphics processor, creating shaders, and executing computations.

Lecture 2: Wed 8 Nov, 3:00- 4:30 PM

This lecture will introduce various libraries developed to encapsulate the details of implementing general-purpose computations on graphics hardware, including BrookGPU, Sh, and Microsoft Accelerator, and will provide practical examples using these libraries. Performance results for several sample applications will be used to demonstrate problems where graphics hardware can accelerate computation, as well as problems that do not gain any significant performance benefits. Approaches for engineering applications to make efficient use of available graphics hardware, both in terms of maximizing arithmetic intensity of parallel algorithms and minimizing the amount of information transferred, will be discussed. Furthermore, common pitfalls, such as the difficulties involved in using a graphics programming interface for non-graphics applications, as well as the limitations of an unfamiliar set of abstractions, will be identified.

The lectures will take place at CAMS, COLLEGE HALL, ROOM 416.