

Advanced Topics for Developers - New Agenda!

2-DAYS WORKSHOP IN CAMBRIDGE

4th & 5th July 2017

Wellcome Genome Campus Conference Centre
Hinxtton, Cambridge, England, CB10 1RQ



WELLCOME
GENOME
CAMPUS

CONFERENCE
CENTRE

More information and registration: <http://www.inteldevconference.com>

DAY 1 AGENDA

TUESDAY 4.7.2017

THEME OF THE DAY: CODE MODERNISATION

08:30 09:00 Registration and breakfast

09:00 09:10 Welcome - Day 1

09:10 09:45 THE CHALLENGE AND REWARDS OF CODE MODERNIZATION

A look at how code modernisation techniques are being used in the scientific community to produce code that takes best advantage of the latest generation of CPU hardware.

Presenter: Stephen Blair-Chappell, Bayncore

09:45 10:30 WHAT PARALELL STUDIO XE OFFERS TO SCIENTISTS

Intel Parallel Studio XE is regarded as 'best in class' for developing optimised programs. In this session we look at the mix of compilers, libraries and profiling tools that Parallel Studio XE offers, and highlight some of the features that are of special significance for scientists and programmers working in Life Sciences.

Presenter: Francois Fayard, Bayncore

10:30 11:00 Coffee break

11:00 11:30 GENERATING PARALLEL CODE – WHAT ARE THE OPTIONS FOR TODAY?

In this session we discuss the different ways that parallelism can be introduced into application development.

Presenter: Gaurav Kaul, Intel

11:30 12:00 PROFILING PARALLEL CODE – WHAT ARE THE OPTIONS FOR TODAY?

Intel Parallel Studio XE provides several different tool to profile your code – for vectorised code, you could use the Compiler Reports, Vector Advisor, or VTune; for parallel code you could use the Compiler, Advisor, VTune, ITAC, and Application Snapshots – the question is, which is best? In this session we highlight the pro's & con's of each tool, discuss how to choose the right tool for you development scenario.

Presenter: Stephen Blair-Chappell, Bayncore

12:00 13:00 Lunch

13:00 13:45 HOW TO WRITE CODE THAT TAKES ADVANTAGE OF THE LATEST GENERATION OF INTEL ARCHITECTURE

Vectorization is one of the critical elements to maximize parallel performance. In this session we will show how to get started with vectorization and avoid common pitfalls. We will review cases where automatic vectorization fails, providing tips and best known methods for effective vectorization. We show how to use the instructions sets – such as AVX512 – found in the latest generation of Intel architecture.

Presenter: : Francois Fayard, Bayncore, Bayncore

13:45 15:00 USING INTEL ADVISOR XE TO MODEL AND ANALYSE CODE

In this session, we show how to use Intel Vector Advisor to check how well your code is being vectorised. Additionally, we look at various memory issues, such as non-contiguous memory accesses and unit stride vs. non-unit stride accesses, and how eliminating such issues can lead to significant speed up of vectorised code and improve the quality of code generated automatically by the compiler.

Presenters: Roger Philp & Stephen Blair-Chappell, Bayncore

15:00 15:30 Coffee break

15:30 16:15 CASE STUDY I - OPTIMIZING ILLUMINA's ALIGNER-ISSAC

Efficient code optimisation that levers best CPU performance is critical for timely and successful Genome Sequencing. In this case study we take a Issac v2 build which uses SSE intrinsics and compare that with the optimized Issac v3 which uses auto-vectorization and compiler switches to build use AVX2.

Presenter: Gaurav Kaul, Intel

16:15 17:00 CASE STUDY II – NBODY OPTIMISATION ON INTEL ARCHITECTURE

Porting and optimizing of an n-body algorithm to the newest generation of Intel processors. Tuning techniques such as scalar optimizations, vectorization with structures of arrays and memory optimizations will be explained and their effect demonstrated.

Presenter: Roger Philp, Bayncore

17:00 17:30 Q & A

17:30 19:00 Networking with drinks & finger food



INTEL® CODE MODERNIZATION WORKSHOP FOR LIFE SCIENCES- 2017

DAY 2 AGENDA

WEDNESDAY 5.7.2017

THEME OF THE DAY: PRACTICAL MACHINE LEARNING AND DEEP LEARNING ON INTEL PLATFORMS

08:30 09:00 **Breakfast**

09:00 10:30 **DEEP LEARNING ON INTEL PLATFORMS**

A session exploring the topic of Deep Learning, and how to use deep learning on Intel Architecture and an introduction to Intel's offering in Machine Learning/Deep Learning and AI.

The morning is split into three sessions, with each session having a mixture of topics and an associated case study. Topics covered include DL networks; Convolutional Neural Networks; and Frameworks – such as Neon, TensorFlow, Caffe, Theano, Torch, CNKT, Chainer, and Kaldi;

Presenters: Gaurav Kaul Intel, Roger Philp & Francois Fayard, Bayncore

10:30 11:00 **Coffee break**

11:00 12:30 **DEEP LEARNING ON INTEL PLATFORMS – Part 2**

12:30 13:30 **Lunch break**

13:30 14:15 **PRACTICAL FRAMEWORKS SESSION 1: USING INTEL NEON ON INTEL ARCHITECTURE**

A Walkthrough of a variety of use cases and technology solutions using the Neon framework.

Presenter: Roger Philp, Bayncore

14:15 15:00 **PRACTICAL FRAMEWORKS SESSION 2: USING CAFFE ON INTEL ARCHITECTURE**

In this session we show how to build Caffe optimized for Intel architecture, train deep network models using one or more compute nodes, and deploy networks. In addition, various functionalities of Caffe are explored in detail including how to fine-tune, extract and view features of different models, and use the Caffe Python API.

Presenter: Francois Fayard, Bayncore

15:00 15:30 **Coffee break**

15:30 16:15 **PRACTICAL FRAMEWORKS SESSION 3: APPLICATION DEVELOPMENT USING KERAS, TENSORFLOW AND THEANO**

In this tutorial we show how to use the Intel-optimized versions *TensorFlow* and *Theano* hosted on the high-level neural networks library *Keras*. As well as demonstrating of how to use these frameworks, the session will include a 'live' VTune analysis of the frameworks and an explanation of how the Intel implemented optimizations were achieved.

Presenter: Stephen Blair-Chappell, Bayncore

16:15 17:00 **HOW TO SUPER-CHARGE YOUR PYTHON CODES USING INTEL OPTIMISED PYTHON**

See how the latest Python distribution from Intel brings a significant performance boost in AI and Deep Learning/Machine Learning codes.

Presenter: Stephen Blair-Chappell, Bayncore

17:00 17:30 **Q & A**

In partnership with:

BAYNCORE

Copyright © 2017 Intel Corporation. All rights reserved. Intel and the Intel logo are trademarks of Intel Corporation in the U.S. and/or other countries.

*Other names and brands may be claimed as the property of others.