The Hartree Centre Summer School Series 2014

Week One: 14-18 July 2014   VISUALIZATION

Course Summary

Learn the skills necessary to develop applications that enable you to assimilate complex information quickly and easily and discover the latest visualization tools.

This Summer School is aimed at those who need to use visualization as a tool in their workflow, be it simulation and modelling or Big Data.

Practical sessions on state of the art visualizations walls, and workstations, are included in the programme.

Academic Leads

Hank Childs (*University of Oregon, USA*)
Hamish Carr (*Leeds University, UK*)

Topics

| Introduction to Visualization |
| Visualization using MATLAB |
| Visualization with VTK |
| Parallel Visualization |
| Visualization Applications |
| Visit & Applications |
| Topology/Feature Analysis |
| Future Directions |

Lecturers include Bob Laramee (*Swansea University, UK*) and Valerio Pascucci (University of Utah, USA)

STFC Hartree Centre
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Summer School 2014
"Visualization"
13 - 18 July 2014

	13 July 2014 Sunday	14 July 2014 Monday	15 July 2014 Tuesday	16 July 2014 Wednesday	17 July 2014 Thursday	18 July 2014 Friday
08:30		**Bus to Laboratory** (*Leaving hotel reception at 08:30*)				
09:00		Introduction to Visualization (*Bob Laramee*)	Visualization with VTK	Parallel Visualization	Visualization Applications (*Dave Pugmire*)	Topology and Feature Analysis (*Valerio Pasucci*)
09:30						
10:00						
10:30						
11:00		**Tea / Coffee Break**				
11:30		Introduction to Visualization (*Bob Laramee*)	Parallel Visualization	Introduction to VisIt	Visualization Applications (*Dave Pugmire*)	Topology and Feature Analysis (*Valerio Pasucci*)
12:00						
12:30		**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**
13:00						
13:30		Practical Session MATLAB	Practical Session VTK	Practical Session Parallel Vis	Practical Session VisIt Tutorial	Future Directions (*Valerio Pasucci, Hamish Carr*)
14:00						
14:30						
15:00	Arrival and Check-In at Hotel					Q & A Session
15:30		**Tea / Coffee Break**				
16:00		Practical Session MATLAB	Practical Session VTK	Practical Session Parallel Vis	Practical Session VisIt Tutorial	
16:30						
17:00		**Bus to Hotel**	**Bus to Hotel**	**Travel to Meal**	**Bus to Hotel**	
17:30				Official Summer School Dinner		
18:00						
18:30						
19:00						
19:30						
20:00						
20:30						
21:00						
21:30						
22:00						

The Hartree Centre Summer School Series 2014

Week Two: 21-25 July 2014   HPC

Course Summary

Learn the skills necessary to develop applications that run on the top 20 machines of the Top500 list, now and in the future.

This Summer School is aimed at those who need program simulation and modelling applications on state of the art supercomputers. Discover the architectures and the best technologies to use.

Practical sessions on a 132,000 core BG/Q and a 20,000 core Intel Xeon cluster, with Intel Phis and NVidia GPUs are included in the programme.

Academic Leads

Jack Dongarra (*University of Tennessee, USA*)
Kirk Jordan (*IBM, USA*)

Topics

HPC from start to finish
HPC Architectures: Yesterday, Today & Tomorrow
Numerical Linear Algebra in a Parallel World
Programming in MPI
Programming in OpenMP
Programming in Parallel
BigData
Visualization
Computational Steering

Lecturers include Julien Langou (*University of Colorado, Denver, USA*), Oliver Tardieu (*IBM, USA*), Christian Terboven (*Aachen University, Germany*) and John Brooke (*Manchester University, UK*

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Summer School 2014
"High Performance Computing"
21 - 25 July 2014

Hartree Centre
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	20 July 2014	21 July 2014	22 July 2014	23 July 2014	24 July 2014	25 July 2014
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
08:30		**Bus to Laboratory** (*Leaving hotel reception at 08:30*)				
09:00		HPC Start to Finish (*Jack Dongarra*)	HPC Start to Finish (*Jack Dongarra*)	Visualization (*David Duke*)	HPC Architectures (*Kirk E. Jordan*)	Big Data (*Chris Williams*)
09:30						
10:00		Programming in Parallel (*Oliver Tardieu*)	Programming in Parallel (*Oliver Tardieu*)	Open MP (*Christian Terboven*)	Practical Session	HPC Architectures (*Kirk E. Jordan*)
10:30						
11:00		**Tea / Coffee Break**				
11:30		Numerical Linear Algebra (*Julien Langou*)	Practical Session	Open MP (*Christian Terboven*)	Computational Steering (*John Brooke*)	HPC Start to Finish (*Jack Dongarra*)
12:00						
12:30		**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**
13:00						
13:30		Practical Session	MPI (*Jon Gibson*)	Practical Session	HPC Architectures (*Kirk E. Jordan*)	
14:00						
14:30		MPI (*Jon Gibson*)	Numerical Linear Algebra (*Julien Langou*)	MPI (*Jon Gibson*)	Practical Session	
15:00						
15:30		**Tea / Coffee Break**				
16:00		Open MP (*Christian Terboven*)	Numerical Linear Algebra (*Julien Langou*)	Programming in Parallel (*Oliver Tardieu*)	Computational Steering (*John Brooke*)	
16:30						
17:00		Practical Session	Practical Session	**Travel to Meal**	Practical Session	
17:30						
18:00	**Arrival and Check-In at Hotel**	**Bus to Hotel**	**Bus to Hotel**		**Bus to Hotel**	
18:30						
19:00		**Dinner at the Hotel**	**Dinner at The Hotel**	**Official Summer School Dinner**	**Dinner at The Hotel**	
19:30						
20:00						
20:30		**Summer School Activities at the Hotel**	**Summer School Activities at the Hotel**		**Summer School Activities at the Hotel**	
21:00						
21:30						
22:00						

The Hartree Centre Summer School Series 2014

Week Three: 28 July – 1 August 2014   BIG DATA

Course Summary

Learn about the opportunities and challenges that Big Data & Analytics presents including the chance to get hands on.

This Summer School is aimed at those who wish to get started in the emerging world of Big Data and Analytics. As well as plenty of opportunity to try out some of the tools and techniques in hands-on lab exercises you will also hear about the wide variety of applications and styles of Big Data and the social implications of its use.

Tools used and discussed will include Hadoop, IBM SPSS Modeller and IBM Streams. There will also be an opportunity to try some open source tools.

Some of the practical sessions will make use of the recently installed Big Data cluster at the Hartree Centre.

Academic Leads

Alok Choudhary (*Northwestern University, USA*)
Chris Williams (*IBM*)

Topics

Big Data and Analytics
Data Warehousing and Business Intelligence
Hadoop – Overview and Hands-On Session
Social Media Analytics
Data in Motion and Predictive Analytics
SPPS Modeller Hands-On Session
Cognitive Computing and IBM Watson
Visualization and Presentation

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Summer School 2014
"Big Data"
27 July – 1 August 2014

Hartree Centre — Science & Technology Facilities Council

	27 July 2014 Sunday	28 July 2014 Monday	29 July 2014 Tuesday	30 July 2014 Wednesday	31 July 2014 Thursday	1 August 2014 Friday
08:30		**Bus to Laboratory** (*Leaving hotel reception at 08:30*)				
09:00		Introduction and Welcome	Big Data, Science & Social Including Use Cases (*Alok Choudhary*)	Social Media Analytics and Other Types of Database (*Phil Tetlow*)	HPC & Big Data (*Chris Thomas*)	Practical Session
09:30		What is Big Data & Analytics (*Chris Williams*)				
10:00					Ethical & Social Implications of Big Data (*Chris Nott*)	
10:30						
11:00		**Tea / Coffee Break**				
11:30		Intro to the Hands On Labs (*Sarah Brader, Nicole Barry*)	Big Data, Science & Social Including Use Cases Continued	Introduction to Streaming Analytics (*Chris Williams*)	Predictive Analytics & SPSS Modeler (*Nicole Barry*)	Closing Discussion (*Chris Wiiliams, Sarah Brader*)
12:00						
12:30		**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**	**Lunch in Thomson Seminar Room**
13:00						
13:30		Data Warehousing & Business Intelligence (*Chris Wiliams*)	Introduction to Hadoop (*Chris Williams*)	Streams Hands on Demo and Introduction (*Sarah Brader*)	Predictive Analytics & SPSS Modeler (*Nicole Barry*)	
14:00						
14:30			Hadoop Hands on Demo (*Sarah Brader, Nicole Barry*)		Practical Session	
15:00	Arrival and Check-In at Hotel					
15:30		**Tea / Coffee Break**				
16:00		The "telecoms" & "zoo" Cases (*Niall Mccarroll, Nicole Barry*)	Hadoop Hands on Demo (*Sarah Brader, Nicole Barry*)	Streams Hands on Demo and Introduction (*Sarah Brader*)	Cognitive Computing & IBM Watson (*Chris Williams*)	
16:30						
17:00		Practical Session	Practical Session	Practical Session		
17:30						
18:00		**Bus to Hotel**	**Dinner in Lab Restaurant**	**Bus to Hotel**	**Dinner in Lab Restaurant**	
18:30						
19:00			Practical Session	Official Summer School Dinner	Practical Session	
19:30						
20:00						
20:30						
21:00						
21:30						
22:00						

Event Details

The 2014 Hartree Centre Summer School Series will consist of three separate weeks of study - each week focussing on a specific topic. You may attend all three weeks, or pick the week most relevent to your area of study. **Each week is limited to 45 registrations.**

- Week 1: 14-18 July *"Visualization"*
  Leaders: Hank Childs (LBL, Oregon) Hamish Carr (Leeds) - *Learn the skills necessary to develop applications that enable you to assimilate complex information quickly and easily and discover the latest visualization tools.*
- Week 2: 21-25 July *"High Performance Computing"*
  Leaders: Jack Dongarra (Tennessee) Kirk E. Jordan (IBM) - *Learn the skills necessary to develop applications that run on the top 20 machines of theTop500 list,now and in the future.*
- Week 3: 28 July - 1 August *"Big Data"*
  Leaders: Alok Choudhary (Northwestern) Chris Williams (IBM) - *Learn about the opportunities and challenges that Big Data & Analytics presents including the chance to get hands on.*

Target Audience and Pre-Requisites

The Summer Schools are aimed at researchers in academia and industry encountering complex application problems that require significant HPC / Visualization / Big Data resources. Typically the attendee will be nearing completion, or will have already obtained, a PhD (or equivalent) in a scientific or engineering discipline that uses computation as a tool and will have some experience of programming in high level programming language (e.g., Fortran, C, C++). There will be some experience of parallel programming (e.g., MPI, OpenMP, or CUDA) or Visualization or Big Data, an understanding of mathematical and computational methods for the solution of partial differential equations plus an understanding of an application area.

Fee Info

The Summer School series consists of three separate weeks of study. Fees for each week are £600. You may attend separate weeks or all three weeks. Your total registration fee will be calculated after you have selected the weeks you want to attend on the registration form. Accommodation at the Britannia Daresbury Park Hotel - and transport to and from the hotel during the Summer School - is included in your registration fees. **We will provide accommodation from Sunday to Thursday inclusive (5 nights) during each week of the Summer School series.** If you are planning to attend more than one week of the series then it is possible to extend your booking to include the Friday and Saturday nights at an extra cost of £69 per night. To extend your booking please select the required dates on the registration form. The extra cost will be added to your final registration fees.

Scientific Organising Committee

Jack Dongarra (University of Tennessee)
Kirk E. Jordan (IBM)

Local Organising Committee

Terry Hewitt (STFC)
Damian Jones (STFC)
Dave Cable (STFC)

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