A Student's Guide to the EPCC Summer Scholarship Programme

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DON'T
PANIC!

This document is intended to provide students working in EPCC under the Summer Scholarship Programme with information on how the Programme will run. Hopefully it will save the sending of hundreds of e-mails throughout the summer, and provide a convenient single reference source for the summer. Please address any questions to `epccssp@epcc.ed.ac.uk`. Much information concerning the SSP is also available via the WWW, at URL:

<div align="center">

`http://www.epcc.ed.ac.uk/ssp/`

</div>

1 Introduction and Background

Students have been working during the summer at EPCC and its precursors since 1987. In that time, what is now the Summer Scholarship Programme has grown from two students to a peak of 26. This year, 12 students from 7 countries will be spending the summer at EPCC.

Through the Summer Scholarship Programme we offer scholarships to students to work at EPCC for 10 weeks during their summer vacation. This year, the scholarships are worth £150 per week. Each student works on an individual project, under the supervision of EPCC staff. Often these projects involve collaboration between EPCC and other groups both within and beyond Edinburgh University.

The programme offers benefits to the students, the collaborators, and EPCC:

Benefits to the students Students get the opportunity to gain experience in High Performance Computing (HPC). They also get the experience of managing their time, performing a real piece of work, and presenting their work both verbally and on paper.

Benefits to collaborators Collaborating groups within the University receive ten weeks' free labour on a project of interest to them in return for assistance with supervision. This allows them to evaluate the usefulness of our resources in their particular application area without investing large amounts of time and effort.

Benefits to EPCC EPCC benefits in several ways. Firstly, we are creating a skill base by training students in how to exploit HPC. Making graduates with experience of HPC available to industry can only help to accelerate the uptake of HPC. Secondly, the SSP has been a very successful recruiting mechanism for the Centre, with several of our current staff coming through it. Finally, through collaborative projects, we can attract new users to our resources, increasing our user community, and perhaps catalysing the use of HPC in new applications areas.

This year's programme involves 12 students from 10 institutions in the UK, Czech Republic, Egypt, Greece, Ireland, Malta and Poland.

2 Before the Programme begins

Accounts All students will have accounts set up on:

- The EPCC cluster. You will have access to a number of machines in EPCC and will receive mail through your cluster account.

- Holyrood, the University's principal central computer - you will need to log onto this system to access your EPCC account from the Computational Physics Lab (3203) or PC Lab (3210).

- The EUCS public access lab PCs in 3210.

Additionally, students may have accounts set up on:

- Sun HPC cluster - many of the projects require this

- Cray T3E - benchmarking only

- NT cluster - benchmarking only

We would expect that most projects which involve parallel computers would use the Sun HPC cluster. Some access will be available to the Cray T3E and NT cluster, but it is expected that this would be for benchmarking purposes only.

Planning Your supervisor will have an initial programme of work for you to undertake as soon as you begin work on the project. You will meet with your supervisor(s) during your first week here (e-mail is generally the best way of contacting them to arrange a time) to discuss your project and the work you will be doing.

Code Some projects will require certain pieces of code to be available for you. These might be sequential source codes, or existing parallel implementations, for example. It is the responsibility of the EPCC supervisor of each project to ensure that these codes are available on the EPCC cluster.

Data Similarly, some projects will require certain data sets to be available. It is again the responsibility of the EPCC supervisor to get any such data sets onto the cluster . . .

3 During the Programme

3.1 The First Week

The week beginning Monday 3rd July is completely taken up with an introductory course. The aim of the course is to give you all a common base of knowledge which will allow you to relate to each other's work during the summer. We also hope that by providing this course, we will reduce the amount of time staff have to spend later in the summer, explaining tools and utilities to you one at a time.

The course begins in the JCMB Computational Physics Lab (JCMB room number 3203) at 9am on Monday 3rd July. There will be signposts to the room from the main entrance of JCMB.

Monday 3rd	am	Introduction to High Performance Computing
	pm	Introduction to High Performance Computing
Tuesday	am	Introduction to High Performance Computing
	pm	Introduction to High Performance Computing
Wednesday	am	Introduction to High Performance Computing
	pm	Introduction to High Performance Computing
Thursday	am	Message Passing Programming with MPI
	pm	Message Passing Programming with MPI
Friday	am	Message Passing Programming with MPI
Monday 10th	am	Shared Memory Programming with OpenMP
	pm	Shared Memory Programming with OpenMP
Tuesday	am	Shared Memory Programming with OpenMP
	pm	Shared Memory Programming with OpenMP

On the first day you will break for coffee at around 11am. This will give an opportunity for you all to meet your supervisors briefly. We *may* also take the opportunity of taking a group photograph at this point. These will be used in the Newsletter, and potentially in publicity material for the Programme.

You will notice that the afternoon of Friday 7th is free - this will give those of you who need to open a bank account a chance to do so. The University branch of the Bank of Scotland will allow you to open an account although you are only here for 10 weeks - most banks would be reluctant to allow you to do this. For those of you who already have UK bank accounts, this will provide an opportunity for you to have a longer meeting with your supervisor to discuss your project.

We will finish the week with some kind of social event, though quite what is undecided at the time of writing — we will let you know! Also, during the week we'd expect there to be frisbee and/or football (soccer) during one or two of the evenings. Again, look out for details.

3.2   Subsequent Weeks

Working Hours: There are no formal hours which you are expected to work, although we expect each of you to put in a full working week of at least 35 hours. For the vast majority of students, this has not proven to be a problem in the past. Your supervisor has to satisfy themselves that you are putting in an appropriate amount of work. Note that this includes encouraging any over-zealous students to go home occasionally!

Lunchtime Meetings: During the second last week of the SSP you will be asked to present your work in a lunchtime seminar. Each student will be expected to provide their supervisor with a copy of their slides the day before the presentation, and the supervisor will be expected to provide the student with feedback on the presentation. The supervisors of students presenting at a particular meeting will normally attend that meeting.

5:15 Reports: Each week, you will be expected to produce a one-page report describing your work that week and your plans for the rest of the project. These reports are called 5:15 reports to remind everyone that they should take 5 minutes to read and 15 minutes to write. You will be expected to submit copies of your report to your supervisor and the co-ordinator by 5:15 on Friday afternoons. This provides us with a means of keeping track of the progress of each

project during the summer, and helps you focus on the progress you make each week. Here is a template for your reports:

```
EPCC SSP 5:15 Report
-------------------------------------------------------------
Week ending Friday 23rd July, 1995
Name: Wile E Coyote

Work Done
--------------------
Built portable jet pack for increasing horizontal velocities
when chasing RR. Had problems with the steering mechanism, and
the range seems only enough to take one over a cliff edge,
from any arbitrary starting point... This may be a publishable
result.

Meeting with Mother to discuss the existential significance of
life. Also did the dishes.

Visisted the Acme factory as a special VIP guest. Discovered lots
of new and cunning devices being produced.

Plans for Coming Week
--------------------
 - Write up results of Project X.
 - Write thank you letters to Acme and Mother.

Any Other Comments
--------------------
```

Social Activities: One of the strengths of the SSP in previous years was the amount of time that the students and staff spend together away from EPCC. This will hopefully be a feature of this year's programme too, and we would encourage you to become as actively involved as possible in any social activities arranged.

4   At the End of the Programme

Students will complete their time in Edinburgh on September 8th.

4.1   Reports

You will be expected to produce a written report describing the work that you have carried out during the summer. A LaTeX template for this report is already installed in your cluster account in the REPORT directory and we will provide some information on how to use LaTeX for those of you who haven't encountered it before. Reports should be between 10 and 20 pages in length, and should be of an appropriate standard to be published as an EPCC technical note. To attain this standard you will need to plan your report carefully in conjunction with your supervisor. Your supervisor will be responsible for providing you with feedback on drafts of the report. Once your supervisor is satisfied with the report, it should be passed on to the co-ordinators for

final editing and inclusion in the set of summer student reports. *You will not receive your final pay cheque until we are satisifed with your report.*

To help you in this process we are asking you to hand in a skeleton report at the end of your 7th week with us, *i.e.,* by Friday 18th August). This should contain section headings for your final report, a fairly full version of your introduction, and a complete section on the background to your project. A paper copy of this initial version of your report should be given to your supervisor (if you have more than one supervisor, work out with them whether they all want a copy or will pass one copy round) and to the co-ordinator by the end of normal working hours (5pm) on that Friday — once the co-ordinator has a copy you will receive your pay-cheque for that week. Reports will be returned to you with comments as soon as possible.

It has been our experience that students often leave too little time to write up properly, and so we hope that by forcing you to outline your report and write one major section of it we will get you started into the whole process earlier. We estimate that for the outline and final reports together you should spend at least a week, full-time, writing. Having you submit an outline report will also give us a chance to provide you with feed-back on your writing style so that the final report can be of high quality.

To some extent, the 5:15 reports will provide a record of your work during the summer, although you may wish to keep a more detailed log book of your work, including design and implementation decisions for example, for later use in your write-up. Final reports should reach the co-ordinator at least two working days before you leave, to allow time for any final corrections to be made.

Note your reports should be partly descriptive of the main stages you have gone through ("I did this, then I did that"), but more importantly should describe the methods used and results obtained in the work you have done. A typical set of section headings might be:

- Introduction
- Background
- Description of approach taken, problems encountered, etc.
- Results obtained
- Conclusion
- References

These are for guidance only — you may well want to split up the sections in the middle more.

Please use the `REPORT` directory for your reports, leave that directory world readable, and make sure that copies of any diagrams used in the report are all contained in that one directory — we will copy that directory at the end of the summer, and want to be able to automate the process . . .

4.2 Posters

EPCC usually holds a Seminar during September at which all students display a poster summary of their project. This year there will not be an Annual Seminar as EPCC is organizing the Second European Workshop on OpenMP (EWOMP), which will be held on 14 and 15 September, just after the SSP ends. However we will still ask SSP students to produce posters towards the end of the Programme, for display in EPCC.

Exact details of what will be required in a poster will be circulated during the summer. As with reports, your supervisor will be responsible for initial quality-control of your poster, before they are passed on to the co-ordinator. Posters should also reach the co-ordinator several days before the end of the Programme, to allow time for any final corrections to be made.

A template for your poster is already installed in your account, in the POSTER directory. Again, please use the POSTER directory for your poster, leave that directory world readable, and make sure that copies of any diagrams used in the poster are all contained in that one directory.

5   Miscellaneous Information

The information contained in this section is broadly based on e-mails sent to past students during the summer — hopefully concentrating the most important bits of that information in one place will be helpful.

5.1   Getting Help

This section contains **essential** information on who you should contact for help with the machines if something goes wrong or if you need to find out more information.

First, the HPC (High Performance Computing) resources – the Sun cluster and any other machines to which you may have access. If you have a problem, or if you need access to manuals for information that your supervisor can't get for you, then e-mail SSP-Support@ed.ac.uk. Your query will be dealt with as soon as possible, and you should at least receive an acknowledgement that your query is being dealt with within four to six hours during the working week.

Next the workstations on the EPCC cluster — the machines in the training room, etc., plus EPCC printers and servers. If something goes wrong — such as a machine crashing so you can't use it, or a printer hanging, then mail support@epcc.ed.ac.uk — this will be sorted out as quickly as possible if it is a genuine fault. However, if you are just using some program wrongly then you are more likely to get a message saying "RTFM" or "Read the (Expletive) Manual."[1] When accessing the EPCC machines via machines operated by the Edinburgh University Computing Service (EUCS), notably the X-Lab machines, and reporting faults if you are remotely logged in, please make sure the EUCS end is working before telling support something is wrong.

Finally, still on the EPCC cluster, if you have run out of disk space (for work purposes, and don't have megabytes of personal stuff in your account), or are wondering whether a particular utility is available, or similar, e-mail support@epcc.ed.ac.uk and ask them. Note — this is not the same as SSP-Support@ed.ac.uk, and has nothing to do with the parallel machines, so don't ask parallel questions of support.

> **Please remember that for most of your project related queries your best source of information will be your supervisor — so ask them first!**

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[1]Unix provides extensive on-line documentation via the manual pages — man command provides the definitive information on command. man -k PostScript provides a list of the manual pages which relate to PostScript. Use these facilities before bothering support.

5.2 Workstation access from the Computational Physics Lab/EUCS PC-Lab machines

The EUCS Public Access lab was upgraded last summer and now has PCs insted of X terminals. We are still clarifying the log-in procedure for these machines - further information will be circulated during the first week of the SSP.

The Computational Physics Lab is likely to be your main base during the summer. From these machines you will be able to log in via holyrood to one of the following machines:

- young.epcc.ed.ac.uk

- sutherland.epcc.ed.ac.uk

- stewart.epcc.ed.ac.uk

- crawford.epcc.ed.ac.uk

- ramsay.epcc.ed.ac.uk

- blair.epcc.ed.ac.uk

- sutherland.epcc.ed.ac.uk

This should start up an X session similar to the one you get when you log in to an EPCC machine. **BUT** they are separate systems, and none of your files will be visible ... the reason we give you access is so you can log in remotely to machines in EPCC. Faults with the machines should be reported to the staff in room 3203/3210, or as indicated on notices on the wall in the Lab. Once you have logged in you can connect to EPCC machines as follows (using `young` as my example, and logging myself (`cafi`) in — you can connect to other relevant machines, and should use your own EPCC username):

First make your display accessible to other machines (so that the EPCC machine can use the display you are sitting at):

```
xhost +              (I am well aware of the security implications
                      of using xhost - if you are worried about it,
                      then you can manually sort out cookies
                      yourself - and if you haven't a clue what I'm
                      talking about, then you don't need to worry!)
```

Next actually log in:

```
rlogin young.epcc.ed.ac.uk -l cafi
```

Finally, once logged in to young, tell it which display you are sitting in front of:

```
export DISPLAY=xlab-??.ed.ac.uk:0.0
```

(Where "??" is the number on the top of the workstation you are using, in the range 1 ... 20.)

Now you should be able to use the EPCC facilities as normal, and things like emacs will display on your workstation in the X Lab.

Some final points — 3203 is a public access workstation room, and is **not** for the exclusive use of the EPCC Summer Scholarship Programme. Other people use this room, so please ensure

that if you are using it you don't "hog" the machines. Don't leave bags and coats lying around there, unless you are actually in the room working. All the normal "not eating and drinking in workstation rooms" rules apply. Be sensible!

A previous student found this technique useful when using the (old) X-Lab machines:

> You must have noticed that your home directory on the xlab machines xlab-1 to xlab-20 is different from your EPCC home directory. But you can do the following to access your EPCC home directory directly from the x-lab machines:

> ```
> xlab-11$ ln -s /homes/remote/epcc.ed.ac.uk/<your EPCC login> EPCC
> ```

> This will mount your EPCC home directory to the directory named EPCC on the xlab machines. Do a 'cd EPCC' to access all your files from xlab machines.

5.3   Sensible Machine Use

Some brief points about sensible machine use: First, you will probably find in the few days after the course that some machines to which you formerly had access will now not let you log on. For most of the summer you should be using the training room machines for editing etc. Clearly if you are sitting at a workstation in 2251 then use it, but if logging from an xlab machine, or wherever, please use the training room machines.

This obviously means that the load on some of the training room machines may be quite large at some points. Therefore you should try and minimise the load you impose on the machine — "sidelines" like reading news, Netscape, ... should be avoided. However, this is not a complete ban — for instance, the newsgroup `comp.parallel` might be of interest to you, and NetScape/WWW can be a useful way of finding information. However, reading news/net surfing/etc. do **not** count as valid excuses for not getting your work done!

If the load on one machine becomes unbearable try another ... `finger @host` will tell you whether anyone is logged in to `host` at the moment, and the utilities `xload` and `/usr/local/etc/top` will help you decide how heavily loaded a machine is.

We'll be keeping an eye on the loading of the machines — if the load is too high, then "sidelines" will be banned completely, so it is in your best interest to use the resources at your disposal sensibly.

5.4   Graphics

If your project will require graphics, *please* let us know well in advance. AVS, which is covered in the visualisation course, is relatively easy to support, but it helps scheduling staff time if we know in advance. More complex facilities, such as video and/or OpenGL graphics *must* be discussed with your supervisor and the co-ordinator as early as possible — a few weeks' notice may be required to make sure staff time is available to show you how to use the available equipment and documentation. Please draw this to your supervisor's attention if you are unsure.

5.5 Accommodation Notes

For those of you staying in the accommodation provided by us, the flat is fully furnished but you must bring your own towels. This year we have rented a 10-person flat on the King's Buildings campus itself.

Please can you let us know what time you arrive in Edinburgh so we can make the necessary arrangements for collecting the keys.

The address of the flat is 65/4 West Mains Road, Edinburgh. Unfortunately, I do not have the postcode at present. There will also be a telephone where you can receive incoming calls, and with an international phone card such as a Jubilee card you should also be able to call out by first dialling a freephone number.

If you are arriving in Edinburgh by plane, then you can either get to this part of town by airport taxi or bus. The airport taxis will take you directly to the house but are fairly expensive – you should expect to pay around £20 for the journey. Alternatively you could get the airport bus into the centre of Edinburgh and then get a taxi or a bus to the flat. Most taxis in Edinburgh are black cabs which you can either pick up from a taxi rank or wave at madly in the street. They will stop for you provided the orange light on the front is switched on. You should still expect to pay around 5 pounds or maybe more (depends on the time of day among other things) to get from the city centre to the flat by taxi.

The airport bus runs a frequent and fast service into the centre of town. The final stop is on Waverley Bridge, beside the train station, and there is a taxi rank just opposite the bus stop. The number 42 bus goes from the centre of Edinburgh to the King's Buildings campus. It costs 80 pence and you must have the correct money as the buses don't give change. This bus leaves from the side of the National Gallery on Princes Street - it's a big building with lots of columns and is difficult to miss! (From the airport bus stop, walk up to Princes Street, the main street, turn left, keeping Princes Street Gardens, the park, on your left side, and take the first road to your left, which is The Mound. You will soon see a bus stop from which you can catch the number 42 bus). If you ask the driver, they'll tell you when you get to Kings Buildings.

If you get off the bus in Mayfield Road where the driver tells you, walk to the crossroads and you will see the King's Buildings campus on the far corner. Turn right into West Mains Road, keeping the campus on your left side, and walk along until you come to Gate 1 (this is the second gate, coming from Mayfield Road. The flats are immediately on your right. If you go down the side closest to the road the doors have got buzzers on and are numbered. 65/4 means street number 65, flat 4 - this is the second set of flats you come to, and flat 4 will be on the first floor.

5.6 Photocopying and Printing

The cost of all of your work-related copying and printing is covered as part of the scholarship programme. However, you **must** write down in the loose-leaf folders by the printers (in rooms 3414 and 2251) any copying and printing you do. See figure 1.

Please try and minimise the amount you do — we are fond of trees! There is 2-sided option on the photocopier which your supervisor will be able to show you. You can also get the laser-printers to print 2 or more pages to a sheet, shrinking the images — a good way to print a longish document is:

NAME					
Type of copying (personal, work, etc.)	**Laser 4p**	**Copier 2p**	**Fax–in 10p**	**Fax–out (UK) 30p**	**Fax–out (International) 50p**

Figure 1: Log Sheet for Copying and Printing

```
lpr -Plw34 -Z2up doc.ps
```

You can use the copiers and printers for personal copying, as long as it is not excessive, and you pay for it. If you copy or print something for yourself, mark it as "Personal" in the record folders, and we'll add up all the copying etc. you need to pay for at the end of the summer: 4p per laser printed sheet, 2p per photocopy, 10p for every incoming fax page, 30p for every outgoing fax page (UK), and 50p for every outgoing fax page (international).

5.7   Emergency Phone Numbers

For those arriving from outside Edinburgh, these numbers may be useful over the first weekend:

EPCC Reception	0131–650–5030
Catherine Inglis, EPCC	0131–650–6716

Please note that EPCC Reception is open from 9.00 to 17.00 only. When nobody is in Reception there is an answering machine where you can leave a message, and my extension will ring through to the Reception if it is not answered in my office after six rings.

6   Conclusion

We hope this document has answered most of your questions about the Summer Scholarship Programme this year. If you still have any questions, please get in touch and we will do our best to answer them. (E-mail is `epccssp@epcc.ed.ac.uk`.)