Swedish e-Science Education

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Two Presentations in München

IEEE eScience Conference:
Swedish eScience Education - a Graduate School in eScience

PLAN-E Workshop:
Challenges of providing a common format for up-to-date eScience graduate education at Swedish universities and HPC centres
SNIC: The Swedish National Infrastructure for Computing

Uppsala University

Linköping University

KTH

Umeå University

Chalmers

Lund University

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SNIC Mission

Provide resources for Computation and Storage

Meet the needs of ALL researchers

Availability by open application procedure
... but also Training

Just a few Examples:

- VASP best practices, LiU February 2015
- MATLAB using SNIC clusters C3SE, Chalmers June 2014
- UPPMAX Intro Course, January 2015
- Scientific Visualisation Workshop, UPPMAX, November 2014
- OpenMP, Lunarc December 2014
- MPI, PDC November 2014
- MATLAB using SNIC clusters HPC2N September 2014
Training vs. Education

Training

- Help users to use the tools & resources efficiently = less user support

Education

- Field Specific & general Courses
- Theory of HPC Computation
- HPC Software & Hardware
Two Research Schools become ONE

1996

NGSSO
FORSKARSKOLA I TEKNISK-YTENSKAPLIGA BERÄKNINGAR
NATIONAL GRADUATE SCHOOL IN SCIENTIFIC COMPUTING

2004

KCSE
Workshops/Seminars
Graduate Program
Multidisciplinary Research
International Contacts
HPC

2013

SÉSE
Some facts:

- All six SNIC centres participated
- Programming & Numerical Analysis
- Courses in common format
- Critical mass of students and best teachers
- More than 100 PhD Graduated
- PhD’s with skills in important application fields
- Preparation + Two weeks at the university + Project

Some facts:
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- Students from Stockholm area
- Summer- and Winter schools
- Dual expertise: Scientific Computing & related applications
- Networking: academia & industry
- KTH Special Courses in Computational Science and Engineering
- Computer Science & Numerical Analysis
Collaboration between Two Research Initiatives

SSE

esence
THE e-SCIENCE COLLABORATION

SERC
Swedish e-Science Research Centre

S3SE
Mission

To provide education in fields where the use of e-Science is emerging

A meeting place for graduate students using e-Science tools and techniques

Identify areas where courses within e-Science are needed
eScience is more than HPC
A Typical Course

- 5 Credits
- 3 Weeks

- Study at home university
- Lectures & Computer Exercises
- Project Work & Examination
Financing

Course
10 Students minimum

Development
80 000 skr

Giving
80 000 skr

Travel grants
10 x 6000 skr
Benefits for Graduate Students

- General Topics
- Experienced Teachers
- Travel Grant 6 000
- Networking
- Special Topics
- Access to top Resources

Generally No fees!!
How Are Course Chosen?

A Call for Courses is posted

Any University can propose
a course in any topic

Courses are selected depending
on different criteria

Selected courses are announced
## Courses

<table>
<thead>
<tr>
<th>Courses, autumn 2013</th>
<th>Enrolled</th>
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</thead>
<tbody>
<tr>
<td>Introduction to programming in science and technology</td>
<td>65</td>
</tr>
<tr>
<td>Computational Python</td>
<td>28</td>
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<tr>
<td>Advanced programming in science and technology</td>
<td>19</td>
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<tr>
<td>Introduction to High Performance Computing</td>
<td></td>
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<tr>
<td>- PDC summer school</td>
<td>63</td>
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<tr>
<td>Advanced numerical Solution of</td>
<td></td>
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<tr>
<td>- Initial Boundary Value Problems</td>
<td>9</td>
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<tr>
<td>Scientific Visualisation</td>
<td>9</td>
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<tr>
<td>Stochastic Methods</td>
<td>20</td>
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# Courses

<table>
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<tr>
<th>Spring 2014</th>
<th>Enrolled</th>
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<tbody>
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<td>Scientific computing</td>
<td>8</td>
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<tr>
<td>Electronic Structure Theory and Calculations</td>
<td>12</td>
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<tr>
<td>Introduction to GPU and accelerator programming</td>
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<tr>
<td>- for scientific computing</td>
<td>16</td>
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<tr>
<td>High Performance Computing</td>
<td>10</td>
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<tr>
<td>Advanced Molecular Dynamics</td>
<td>22</td>
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<td>56</td>
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<tr>
<td>- PDC summer school</td>
<td></td>
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<tr>
<td>Matrix Computations in Statistics and with Applications</td>
<td>13</td>
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<tr>
<td>Introduction to programming in science and technology</td>
<td>18</td>
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<tr>
<td>Computational Python</td>
<td>26</td>
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<tr>
<td>Numerical Linear Algebra</td>
<td>6</td>
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<tr>
<td>Scientific Visualisation</td>
<td>11</td>
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<tr>
<td>Scientific Software Development Toolbox</td>
<td>21</td>
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<tr>
<td>Winter School in Multiscale Modeling</td>
<td>22</td>
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<tr>
<td>Climate Modeling</td>
<td>15</td>
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<tr>
<td>Courses, spring 2015</td>
<td>Location</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
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<tr>
<td>Tools and Techniques for Simulation and Optimisation</td>
<td>Umeå</td>
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<tr>
<td>Introduction to Climate Modelling - module II</td>
<td>Stockholm university</td>
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<tr>
<td>High Performance Computing</td>
<td>Umeå</td>
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<tr>
<td>Performance Optimisation of Numerical Simulation Codes</td>
<td>KTH</td>
</tr>
<tr>
<td>Introduction to GPU and accelerator programming - for scientific computing</td>
<td>KTH</td>
</tr>
<tr>
<td>Big Data Analytics with Hadoop and Spark</td>
<td>Chalmers</td>
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</table>
Recent Events

PYTHON FOR MATLAB USERS
V47

SCIENTIFIC VISUALISATION WORKSHOP 2014
27,28 November, Uppsala University

WINTER SCHOOL IN MULTISCALE MODELING
1-12 December, KTH, Stockholm

SNIC USER FORUM 2014
15-16 December, Linköping
Different Cultures
Reaching Out
Reaching New Communities
Conclusion

We continue to offer Education, while having a close eye on what is going on.

But we must get better in reaching out to students and other research communities, especially in humanities.

Nordic School
Have a Look at our Website!

http://sese.nu

Subscribe to get the latest news!