

Jobbnorge-ID: 116109

Søknadsfrist: Avsluttet

Nettside:

Omfang:

Varighet:

PhD fellowship in High Performance Computing (HPC)

The Faculty of Information Technology, Mathematics and Electrical Engineering (<http://www.ntnu.edu/ime>) at the Norwegian University of Science and Technology (NTNU) has a vacancy for one PhD candidate position in High Performance Computing (HPC) at the Department of Computer and Information Science (<http://www.ntnu.edu/idi>).

Information about the Department

The Department of Computer and Information Science is the largest department in the Faculty of Information Technology, Mathematics and Electrical Engineering, with approx. 140 employees of which the scientific personnel are organized in 5 research groups. The PhD candidate will be affiliated with the Algorithms, HPC and Graphics Group (<http://www.ntnu.edu/idi/groups/ahg>). Further information can be found at the department's and the group's web pages.

Work description

Access to high-end High Performance Computing resources are now necessary for a range of applications. However, as these resources become more complex to utilize, developing and maintaining applications for heterogeneous computing systems that may consist of GPUs and MICs and other co-processors/accelerators pose many challenges, especially in medical image processing, where real-time requirements are also added. This opens up a range of research topics. The candidate we are seeking will be working on cutting edge research related to:

- How to best characterize emerging heterogeneous resource type (e.g. GPUs, MICs, etc) with respect to performance, energy usage and/or software sustainability
- How to build a framework that can support two or more of the above resource types with respect to the above criteria. This task may include developing techniques for auto-tunable applications that can handle a range of different GPUs and other accelerators.
- Analyse target applications from medical visualization and maybe also oil & gas and/or matrix computations and identify and explore the requirements they would pose on a heterogeneous environment, including large-scale HPC systems

The research may also look into how to adapt such frameworks in the context of cloud-based HPC.

The appointment is for a term of 4 years, with duties equivalent to 25 %, or 3 years without duties. Duty work, if relevant for a candidate, will primarily be related to support of education tasks. This is a researcher training position aimed at providing promising future researchers the opportunity of academic development in the form of a doctoral degree.

Qualifications

A master's degree in computer science, computational science, or equivalent with very good results is required, with an average grade B or better as measured in ECTS (European Credit Transfer System) grades, or an education at the equivalent level. A solid knowledge of the following is essential, and a research-oriented master thesis is expected.

- Developing larger parallel application and system software in C/C++ and parallel programming environments, including CUDA, MPI and OpenMP
- Experience with HPC benchmarking, performance modelling, and performance analysis of scientific applications for multicore/ many-core and distributed memory systems.
- Experience with HPC code generation, runtime frameworks and their interactions.
- Experience with numerical methods, including FFTs, linear algebra and computational kernels and hardware-aware programming.
- Demonstrated ability to work independently as well as collaboratively.
- Excellent written and oral communication skills.

Additional desired qualifications:

- Experience with computational medical imaging and OpenGL
- Experience with parallelizing signal processing and imaging applications, especially in the context GPUs/Accelerators
- Experience with compression algorithms

The applicant must enclose a short essay (up to 1000 words) describing his/her view of what the main research challenges are in providing heterogeneous resources for HPC.

The position requires strong English oral and writing skills as the candidate will be interacting with a team of international researcher, including our main EU partner from Ireland. The job will include providing several progress reports, teaching and writing scientific reports in English.

If the applicant's PhD is not from an English speaking country, the following tests can be used as documentation, unless the applicant already has shown English proficiency through pre-interviews: TOEFL, IELTS and Cambridge Certificate in Advanced English (CAE) or Cambridge Certificate of Proficiency in English (CPE). Minimum scores are:

- TOEFL: 600 (paper-based test), 92 (Internet-based test)
- IELTS: 6.5, with no section lower than 5.5 (only Academic IELTS test accepted)
- CAE/CPE: grade B or A

In addition, potential successful candidate will be interviewed via Skype or other means.

Emphasis will be put on personal qualities and potential as a researcher. High importance will also be attached to personal communication and cooperation skills.

The PhD position shall contribute to the current strategy of strengthening the Department's research activities. A requirement is a Norwegian master's degree in a relevant research area or a corresponding master's degree from a country outside Norway, recognized as equivalent to a Norwegian master's degree, or competence at a corresponding level documented by academic work of the same scope and quality. The candidate's potential for strengthening the department's research will be important when evaluating an application, in addition to the applicant's education, publications, and qualifications for completing the project.

Formal regulation

Appointments are made in accordance with the regulations in force regarding terms of employment for PhD candidates issued by the Ministry of Education and Research, with relevant parts of the additional guidelines for appointment as a PhD candidate at NTNU. Applicants must undertake to participate in an organized PhD programme of study during their period of employment. The person who is appointed must comply with the conditions that apply at any time to employees in the public sector. In addition, a contract will be signed regarding the period of employment, including duty work if relevant.

Applicants must be qualified for admission as PhD students at NTNU. See <http://www.ntnu.edu/ime/research> for information about PhD studies at IME, NTNU.

Salary conditions

The position is in code 1017 Stipendiat, salary grade range 50-62 in the Norwegian State salary scale, gross NOK 430 200 - 529 500 per year, depending on qualifications. A deduction of 2 % is made as a statutory contribution to the Norwegian Public Service Pension Fund.

General

We can offer

- a professional research environment targeting scientific and technological challenges with dedicated colleagues
- attractive schemes for housing loan, insurance and pensions in the Norwegian Public Service Pension Fund

The Faculty of Information Technology, Mathematics and Electrical Engineering wants to attract outstanding and creative candidates who can contribute to our ongoing research activities. We believe that diversity is important to achieve a good, inclusive working environment. We encourage all qualified candidates to apply, regardless of the gender, disability or cultural background.

For further information, please contact Associate Professor Anne Cathrine Elster, e-mail: elster@idi.ntnu.no, phone: +47 981 02 638 or Professor Letizia Jaccheri, Head of Department, e-mail: Letizia@idi.ntnu.no, phone +47 918 97 028. For information about processing of applications, please contact Senior Executive Officer Anne Kristin Bratseth, phone +47 73 59 67 15, e-mail: anne.kristin.bratseth@ime.ntnu.no.

The appointment is subject to the conditions in effect at any time for employees in the public sector.

Under Section 25 of the Freedom of Information Act, information about the applicant may be made public even if the applicant has requested not to have his or her name entered on the list of applicants.

The application must contain

- Curriculum vitae (CV) with information about the candidate's prior training, exams, and work experience
- certified copies of transcripts and diplomas
- a short presentation of the motivation for a PhD study and how the applicant sees his/her background suitable
- the applicant's view of research challenges within the area of the PhD position (up to 1000 words) describing his/her view of what the main research challenges are in providing heterogeneous resources for HPC.
- at least 2 reference persons
- master thesis (in PDF)
- publications that the applicant wishes to be taken into account; joint work should clearly indicate the applicant's contribution
- Names and contact information of at least two references

Incomplete applications will not be taken into consideration.

The application must be sent electronically as one combined PDF file via this page.

Mark the application IME 046-2015

Deadline for applications: 31.08.2015

Tilleggsinformasjon

Arbeidssted: