Doctoral Programme in Computer Science
(Swedish: Datalogi)

PROGRAMME DESCRIPTION

9 september 2016

The purpose of this document is to describe the process of running and managing the Doctoral Programme in Computer Science. Its primary audience are those involved in the process. Doctoral studies from point of view of the PhD student are described in the study plans of the two subject areas listed below.

1 Subject Areas

The Doctoral Programme in Computer Science at KTH consists of the third cycle subject areas (sv. forskarutbildningsämnen) Computer Science and Speech and Music Communication, further divided into tracks:

- **Computer Science:**
  - Theoretical Computer Science
  - Computer Vision and Robotics
  - Computational Biology
  - High Performance Computing and Visualization

- **Speech and Music Communication:**
  - Sound and Music Computing
  - Speech Technology and Communication

2 Purpose and Aims of the Doctoral Programme

The objectives of third cycle education are formulated centrally for KTH and follow the ones of the Higher Education Ordinance, Annex 2 Qualifications. In this context, the aim of the doctoral programme is to provide enrolled students with deep knowledge of their research subject and the ability to conduct independent research, development, education, and inquiries within diverse parts of society. Additionally, the aim is to provide students with the ability to independently initiate, plan, and lead this type of work, and to promote awareness of ethical aspects of their work.
3 Volume and Recruitment

The expected number of PhD students within the programme at any point in time is in the order of 65 full time students. Annually, about 10–15 new students are expected to join the programme. Target groups for recruitment are MSc candidates in computer science or related areas including branches of mathematics and engineering, or students with corresponding qualifications in an application area such as biology, physics, acoustics, or computational linguistics.

Recruitment and advertisement follow the KTH rules.

4 Funding

Funding of the doctoral programme, including quality assurance and PhD student positions, comes mainly from faculty research funding and external research funding, for instance through participation in graduate research schools. The programme receives additional funding directly from the CSC school at KTH.

5 Programme Organisation

The programme is managed by a Programme Coordinator (sv. programansvarig, PA) in collaboration with a Programme Council (sv. programråd). Represented in the council are each of the participating tracks, the Director of Postgraduate Studies (sv. forskarutbildningsansvarig, FA), and the Postgraduate Students’ Council at the CSC school. While the PA is responsible primarily for the process as described in this document, the FA is responsible primarily for monitoring and enforcing the various requirements and regulations. The Programme Council typically meets four times per year.

6 Courses

The course curriculum consists, for each track, of a selection of so-called core courses, complemented through a number of shell courses. The purpose of the curriculum is to provide stability to the programme by guaranteeing that the core courses of each track will be offered on a regular basis (that is, every 1-3 years), and that sufficiently many shell courses will be offered.

Core courses are of a relatively stable nature and are spelled out in the study plan of the subject area. They are intended to provide the foundational knowledge and state-of-the-art that is central to the subject sub-area corresponding to the given track. The department behind the track is responsible for guaranteeing that these courses are funded and offered on a sufficiently regular basis.

Shell courses on the other hand are of a more dynamic nature, and have the purpose to cover in depth new developments and trends within the subject sub-area. They are typically initiated by the interested faculty member. Funding can
come from various sources, such as faculty or external research funding, and every department has to make sure that a sufficient volume of such courses is offered and funded. The development of a small number of new shell courses is funded directly from the budget of the doctoral programme. A list of courses is maintained on the web pages of the doctoral programme. The course requirements are described in the study plans of the two subject areas.

7 Common Activities

The doctoral programme organizes a biannual PhD student workshop with participation by students, supervisors, and invited speakers. At the retreat, student research results are presented, and changes to the doctoral programme are discussed. Also biannually, an introductory meeting for new PhD students is arranged where the most important functions of the school are presented, and where the research groups get an opportunity to present themselves.

8 Quality Assurance

8.1 Doctoral Programme

The doctoral programme is subject to a continuous process of improvement through evaluation of courses, of student progress, and of the adequacy of supervision and theses produced. The programme council and the programme coordinator should keep up to date with local and international discussion on quality both within the subject area and for research level education in general, and continuously adapt the programme according to best practices.

8.2 PhD courses

The programme coordinator is responsible for checking that newly created courses are accompanied by course plans that meet the standards of the school. In particular, a course plan has to spell out the intended learning outcomes (ILO), the activities that will be used to teach these ILO, and how they will be examined.

Research level courses are evaluated according to the rules of the school and of KTH. This entails that course evaluations are produced and published every time a course is given.

8.3 PhD research

Progress of PhD research is monitored according to the following scheme:

- The student is supervised by a main supervisor and one or two co-supervisors. Regular, preferably weekly meetings take place between the student and the
student’s supervisors to monitor and discuss progress in the doctoral research.

- Each student writes annually a *progress declaration* to be discussed with two academic staff, not including the supervisors. The aim of this is to evaluate the student’s PhD study progress, with focus on the quality and quantity of progress and supervision, and to identify and remedy potential problems or conflicts. The discussion may lead to adjustments to the doctoral student’s team of supervisors.

- Each student’s *individual study plan* is revised annually and approved by the main supervisor and the director of postgraduate studies.

- All students enrolled in the programme, including scholarship holders and industry-employed doctoral students, are expected to make timely advancement in the manner outlined in a separate official *policy on progression steps* of the programme.

### 8.4 Doctoral theses and publications

The quality of *doctoral theses* is evaluated in accordance with the subject areas’ prevailing publication norms as described below, and through discussion in the examination committee, optionally supplemented with the opponent and the main supervisor.

Publication norms within Computer Science are not homogeneous due to differences in culture, and because the subject ranges from pure theory to pronounced applied research. Within large parts of computer science, publication at the best conferences often ranks higher in terms of impact than does journal publication. A thesis of high quality may center on just one breakthrough result published in a first-tier journal or conference proceedings, or it may be based on a series of journal and/or conference publications where research questions are successively developed and solved.

All intermediate points on the scale between these two extremes are possible. For monographs, the reported results must be of publishable quality and the publications on which the monograph is based must be referenced. The order of authors within the computer science area is not stable (it can be alphabetic or follow some of the systems whereby the role of the author is apparent from the sequence of co-authors). All of this must be taken into account when the contribution of the student is evaluated.

### 9 National and International Networks

The curriculum is coordinated with neighbouring doctoral programmes at KTH, as well as with local and national graduate schools. International graduate schools (so-called *summer schools*) are frequently arranged on different topics within various
international organizations. These schools are often suitable as an integrated part of PhD student syllabi.

An extended visit to an internationally well-recognized research group with a relevant research profile is a natural part of PhD studies, and is therefore recommended to be included in individual study plans.

Industrial collaborations in the form of research visits and internships are also encouraged. These should be planned for and agreed upon together with the student’s supervisors, and are to be specified in the individual study plan.