Computer simulations of complex problems play a key role in today’s scientific studies and engineering design. The Master Programme in Computational Science provides you with the opportunity to broaden and deepen your knowledge of natural science or technology, with a specialisation in computers and mathematical modelling. You will learn to apply computational methods, programs and software, as well as mathematical and statistical models, within your sphere of interest.

Large or small, at the macro or micro level – various phenomena are today studied on a computer screen. To be able to use, develop and apply computer simulations within a certain subject area requires not only a solid background in the actual subject field such as chemistry or physics, but also computational methods, advanced computers, software, programming, as well as statistical and mathematical models. The Master Programme in Computational Science provides you with this knowledge.

Computational science is a multidisciplinary field where issues in areas such as chemistry, biology, physics and geosciences are studied, using advanced computers and software to perform numerical simulations based on mathematical and statistical methods.

### ABOUT THE PROGRAMME

The multidisciplinary character of computational science is reflected in the contents of the Master Programme in Computational Science. The courses provide knowledge of:

- Advanced multicore computer systems
- Software and programming
- Numerical and statistical computational methods
- Mathematical and statistical models in for example physics, chemistry, biology or geosciences.

Some of the characteristic courses of the programme are:

- Computational Physics
- Computational Chemistry
- High Performance Computing and Programming
- Optimisation
The precise extent of each component will depend on individual selections. Through the wide range of elective courses the programme can be tailor-made, taking into account your educational background and areas of interest with regard to applications in science. The first course in the programme is a bridging course in scientific computing, serving as a bridge between the programme and your previous education.

DEGREE
The programme leads to a Master of Science (120 credits) with Computational Science as the main field of study.

INSTRUCTION
The instruction consists of lectures, group work, project work and assignments. Instruction is in English and conducted in close connection with current research. In addition to the thesis work carried out throughout the last semester, a wider project course is included in the programme. In this project course you apply skills in computational science to a problem originating in academia or industry, while the course provides training in project work. The programme takes place in Uppsala.
Computers are used to study problems within sectors where experiments are expensive or impossible to perform, or where systems are so complicated that simplified assistance models are insufficient. Important examples can be found within the environmental industry and the energy sector. The use of tools based on computer calculations and simulations is currently increasing substantially within companies of different sizes and within many different sectors. Computer simulations can be performed within many areas such as weather forecasts, design of pharmaceuticals, development of new aircraft, or studies of greenhouse effects. Computer simulations play a central role for increased understanding and product development within these areas, as well as in determining performance and other qualities for processes and products, or to optimise design and quality.

The interdisciplinary content of the programme provides you with unique skills currently in demand in the labour market. There is an increasing need of qualified manpower that combines scientific knowledge with mathematical modelling and proficiencies in using modern computational scientific tools. This combination is important, and a rapid increase in demand for newly qualified people with such combination is expected over the next ten years – both in Sweden and internationally.

The programme also prepares for PhD studies in, for example, computational science, physics, bioscience and mathematics.

The use of computer simulation as a tool is increasing in industry. This is true especially in fields where experiments are too expensive, dangerous or even impossible to perform. Important examples can be found in the environmental industry or in the energy field. After having completed this programme you will have gained multidisciplinary competence, combining general knowledge in computer simulation and mathematical modelling with skills in using modern computational tools and the knowledge of a selected field of science. This is a powerful combination and the demand for that type of expertise will increase within a ten-year period.

The professional career may be in scientific or technical research and development, as scientific and/or technical advisor, consultant or project leader. The programme also prepares you for PhD studies in e.g. computational science, physics, bioscience, and mathematics.
MASTER PROGRAMME IN COMPUTATIONAL SCIENCE

120 credits

Autumn 2017 100% Campus

Location: Uppsala

Application Deadline: 2016-01-15

Enrolment Code: UU-M1321

Language of Instruction: English

Requirements:

Academic requirements

A Bachelor’s degree, equivalent to a Swedish Kandidatexamen, from an internationally recognised university. The main field of study must be within science, engineering, mathematics or computer science.

Also required is:

- 30 credits in mathematics, including algebra, linear algebra, calculus and vector calculus;
- 5 credits in programming; and
- 5 credits in numerical methods (numerical analysis or scientific computing).

Language requirements

All applicants need to verify English language proficiency. This is normally attested by an internationally recognised test such as TOEFL or IELTS with the following minimum scores:

- IELTS: an overall mark of 6.5 and no section below 5.5
- TOEFL: Paper-based: Score of 4.5 (scale 1–6) in written test and a total score of 575. Internet-based: Score of 20 (scale 0–30) in written test and a total score of 90
- Cambridge: CAE, CPE

Exemptions for students from certain countries.

Selection:

Students are selected based on:

- a total appraisal of quantity and quality of previous university studies; and
- a statement of purpose (1 page).

Fees:

If you are not a citizen of a European Union (EU) or European Economic Area (EEA) country, or Switzerland, you are required to pay application and tuition fees. Read more about fees.

Application Fee: SEK 900

Tuition fee, first semester: SEK 72500

Tuition fee, total: SEK 290000

CONTACT & MORE INFO

Department of Information Technology
Lägerhyddsvägen 2, Uppsala
P.O. Box 337, SE-751 05 Uppsala, Sweden

For programme-specific information, please contact: Stefan Pålsson stefan.palsson@it.uu.se

Telephone: +46 18 471 29 70

Fax: +46 18 52 30 49

For general information about Master’s studies at Uppsala University, please send an email to: masterprogrammes@uu.se