MSc in Applied Computational Science, Chemistry

LUND UNIVERSITY | SWEDEN

- Master of Science, Major Applied Computational Science with specialisation in Chemistry
- 2 years, full-time, 120 ECTS credits
- Centre for Mathematical Sciences
- Lund Campus
- Application deadline: January 2024
- Programme start: August 2024

PROGRAMME OVERVIEW

Are you drawn to challenges in chemistry and advanced computations? This Master's programme gives you knowledge in how to use numerical simulations and machine learning to make forecasts and analyses, or to replace experiments. You can learn how to generate and store large amounts of data and use data science to search for patterns, connections, and trends in issues related to chemistry.

Advanced computations are increasingly important in research and business. On this Master's programme you will learn how to study complex processes within chemistry, and how computational science can contribute to knowledge evolution in society. Some examples of angles to focus on could be environmental and climate change, climate adaptation, environmental protection and chemical risks, biodiversity or ecosystem services. In addition to theory for computational science, there will be an emphasis on obtaining knowledge about the practical tools that are used by professionals in the field, including training your skills in programming.

The programme prepares you for a future career in academia or business. The Master's programme gives you specialised knowledge in the field of computational science, while also being interdisciplinary in character. You will take courses alongside students from other specialisations, and there will be a chance to conduct joint projects and degree projects. You will take advanced courses in chemistry in order to build on your subject knowledge from your Bachelor's degree.

You will get general knowledge and skills of importance for computationally intensive professions, such as problem formulation, searching for information, data processing, scientific writing, and presentation techniques. The programme has strong ties with research. You will be taught by internationally well-recognised researchers, and you will be in contact with several research groups. The programme is taught in English.

PROGRAMME MODULES/COURSES

At the start of the programme, you will study molecular driving forces and chemical bonding. The courses include (bio)chemical data analysis with the help of programming in Python, and also elements from quantum mechanics, statistical thermodynamics, spectroscopy and intermolecular interaction relevant to computation, as well as computer laboratory sessions. Thereafter, you will study Mathematics for Scientists 2. In the first part of the spring semester, we recommend advanced courses in statistical thermodynamics and molecular simulation, and molecular quantum chemistry. Then you go on to study biostatistics and computational programming in Python

During the second year, you study obligatory general courses in modelling in computational science and reproducible data analysis and statistical learning. You will also study applied courses in the modelling of chemical systems and the processing and analysis of chemical data. The last semester is reserved for the Master's thesis.

CAREER PROSPECTS

Graduates of the programme can embark on several different career paths. The Master's programme gives you a solid foundation for third-cycle education in the natural sciences, or a career within industry or business. You can thus also choose a career path outside academia and then find attractive jobs in areas where there is a need to solve natural science problems with the help of statistics, data processing or simulations, in industry or in public administration and other organisations..

ENTRY REQUIREMENTS AND HOW TO APPLY

Entry Requirements

Bachelor´s degree of at least 180 credits, including 90 credits in science of which 15 credits should be in mathematics and 45 credits should be in chemistry including 15 credits in physical chemistry.

Proficiency in English equivalent to English 6/B from Swedish upper-secondary school.

or

Bachelor´s degree of at least 180 credits, including 90 credits in science of which 15 credits should be in mathematics and 75 credits should be in physics.

Proficiency in English equivalent to English 6/B from Swedish upper-secondary school.

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How to apply

1. Apply online: Go to www.lunduniversity.lu.se/applied-computational-science-chemistry. Click on "Apply" and follow the instructions for the online application at www.universityadmissions.se, the Swedish national application website. Rank the chosen programmes in order of preference.

2. Submit your supporting documents:

- **General supporting documents :** Check what documents you need to submit (i.e. official transcripts, degree diploma/proof of expected graduation, translations, proof of English, passport) and how you need to submit them at www.universityadmissions.se.

- **Programme-specific supporting documents:** When applying for this programme, you must also submit a 'Summary Sheet' with your application. See the programme webpage for details.

3. Pay the application fee (when applicable).

The selection will be based on grades awarded for previous academic courses in science, engineering and mathematics, as well as the statement of purpose clarifying the applicant's objective with the programme (from the applicant's "Summary Sheet").

Tuition fees

Tuition fee SEK 170 000 per year for non-EU/EEA citizens. No fee for EU/EEA citizens. See www.lunduniversity.lu.se for details on tuition fees.

ABOUT THE CENTRE FOR MATHEMATICAL SCIENCES

The Centre for Mathematical Sciences is both part of the Faculty of Science and of the Faculty of Engineering. The Centre consists of approximately 120 employees. We carry out research and teaching in mathematics, mathematical statistics and scientific computing. The personnel of the Centre can be clustered according to different non-disjoint criteria, e.g. according to title, faculty, subject or research groups. The three administrative divisions are: Mathematics (Faculty of Science), Mathematics and Numerical Analysis (Faculty of Engineering) and Mathematical Statistics).

ABOUT LUND UNIVERSITY

Lund University was founded in 1666 and is repeatedly ranked among the world's top universities. The University has around 45 000 students and more than 8 000 staff based in Lund, Helsingborg and Malmö. We are united in our efforts to understand, explain and improve our world and the human condition.

Lund is considered one of the most popular study locations in Sweden. The University offers one of the broadest ranges of programmes and courses in Scandinavia, based on cross-disciplinary and cutting-edge research. The unique disciplinary range encourages boundary-crossing collaborations both within academia and with wider society, creating great conditions for scientific breakthroughs and innovations. The University has a distinct international profile, with partner universities in approximately 75 countries.

Lund University has an annual turnover of EUR 892 million, of which two-thirds go to research in our nine faculties, enabling us to offer one of the strongest and broadest ranges of research in Scandinavia.

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Learn more at www.lunduniversity.lu.se

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