



Masters Programme in Computer Science

Choosing Tracks





# Masters Programme

## Second Cycle studies

Acquire specialised knowledge, skills and capacities in relation to first-cycle programmes by:

- ▶ further developing the students' ability to integrate and apply knowledge autonomously
- ▶ developing the students' ability to deal with complex phenomena, issues and situations
- ▶ developing the students' potential for employment that demands great autonomy or for research and development work



## Role of the Tracks

Students should

- ▶ demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a **considerable degree of specialised knowledge in certain areas of the field** as well as **insight into current research and development work**
- ▶ demonstrate **specialised methodological knowledge** in the main field of study
- ▶ demonstrate the skills required for **participation in research and development work** or autonomous employment in some other qualified capacity.



## Words of advice

- ▶ Design your track to go deep into one field of CS
- ▶ Make use of excellent research at KTH
- ▶ Select track courses around a common theme



# Tracks

- ▶ CSCS: Cognitive Systems
- ▶ CSDA: Data Science
- ▶ CSID: Interaction Design
- ▶ CSSC: Scientific Computing
- ▶ CSST: Software Technology
- ▶ CSTC: Theoretical Computer Science
- ▶ CSVG: Visualization and Interactive Graphics



# CSCS: Cognitive Systems

This track is about the development of programs displaying artificial intelligence, i.e. abilities normally associated with humans. Within this track it is possible to further specialize towards computer vision and robotics or towards conversational systems.

- ▶ Machine Learning
- ▶ Computer Vision and Robotics
- ▶ Conversational Systems

Faculty: Gabriel Skantze (coordinator), Jonas Beskow, Johan Boye, Patric Jensfelt, John Folkesson



## CSDA: Data Science

Our society is producing an enormous amount of data. This track is about methods to handle and analyze data from different sources, such as biological sequence data, images and video, text, etc.

- ▶ Statistical Machine Learning
- ▶ Natural Language Processing
- ▶ Bioinformatics

Faculty: John Folkesson (coordinator), Hedvig Kjellström, Jens Lagergren, Erwin Laure, Atsuto Maki, Josephine Sullivan, Lars Arvestad, Johan Boye, Stefan Carlsson, Johan Hoffman, Viggo Kann, Jussi Karlgren, Pawel Herman, Jeanette Hellgren Kotaleski



## CSID: Interaction Design

The students learn how to develop interactive systems using modern development techniques. The track will also give a deeper knowledge in how to systematically evaluate interactive systems.

- ▶ Interaction Design Methods

Faculty: Ylva Fernaeus (coordinator), Cristian Bogdan, Lotta Sallnäs Pysander, Kia Höök, Jarmo Laaksolahti





# CSSC: Scientific Computing

This track is about techniques for mathematical modeling and numerical simulation of physical, chemical or biological systems. This is the basis for doing virtual experiments, such as simulated car crashes, but also for building interactive virtual environments, for example for computer games.

This track also includes how to use modern supercomputers for high performance computations, with focus on parallel algorithms.

- ▶ Methods in Scientific Computing
- ▶ High Performance Computing

Faculty: Johan Hoffman (coordinator), Erik Fransén, Pawel Herman, Johan Jansson, Arvind Kumar, Erwin Laure, Stefano Markidis, Christopher Peters, Tino Weinkauff



# CSST: Software Technology

This track is about methods for designing, developing and maintaining software.

- ▶ Software Engineering, Reliability
- ▶ Cryptography, Security
- ▶ Programming Languages, Compilers

Faculty: Philipp Haller (coordinator), Mads Dam, Karl Meinke, Sonja Buchegger, Michael Minock



# CSTC: Theoretical Computer Science

Theoretical computer science is the study of abstract or mathematical aspects of computing. Work in this field is often distinguished by its emphasis on mathematical technique and rigor.

- ▶ Advanced Mathematics
- ▶ Cryptography
- ▶ Formal Methods

Faculty: Per Austrin (coordinator), Dilian Gurov, Johan Håstad, Danupon Nanongkai, Jakob Nordström, Douglas Wikström



# CSVG: Visualization and Interactive Graphics

This track spans from the basics of visualization and graphics to recent research topics. It consists of courses that provide a mix of theoretical knowledge and practical expertise. Programming is an integral part of this track.

- ▶ Information Visualization
- ▶ Computer Graphics
- ▶ Game Design

Faculty: Tino Weinkauff (coordinator), Mario Romero, Christopher Peters, Björn Thuresson, Roberto Bresin, Mårten Björkman