Master’s Programme in Computer Science

Philipp Haller, Programme Director
Associate Professor, School of Electrical Engineering and Computer Science
Master’s in Computer Science

- **Computer Science**
  
  - Scientific methods for constructing computer programs, including theoretical foundations as well as practical skills for developing products and systems that include computer hardware and software.

- **Education**
  
  - A broad education in computer science with opportunities to go deep and specialise within the field.

- **Career Opportunities**
  
  - **Careers in industry:** software developer, IT consultant, game developer, IT designer, IT project manager, systems engineer, business process engineer
  
  - **Careers in research:** excellent opportunities for doctoral studies all over the world
Programme Overview

Master's Programme in Computer Science

Track + Master's thesis = in-depth studies in specialised field

- Artificial Intelligence
- Internet Protocols
- Security
- Advanced Algorithms
- CS Methods

Track Courses (minimum 30 credits)

Elective Courses

Thesis (30 credits)

Autumn 2020  Spring 2021  Autumn 2021  Spring 2022
Mandatory Courses

- **Regular courses**
  - DD2440 Advanced Algorithms, 6 credits
  - DD2395 Computer Security, 6 credits
  - IK2218 Protocols and Principles of the Internet, 6 credits
  - DD2380 Artificial Intelligence, 6 credits

- **Cross-cutting and integrating courses**
  - DA2210 Introduction to the Philosophy of Science and Research Methodology for Computer Scientists, 6 credits
  - DD2300 Program Integrating Course in Computer Science, 2 credits
Specializations: Overview

- **Cognitive Systems**
- **Data Science**
- **Interaction Design**
- **Scientific Computing**
- **Security and Privacy**
- **Software Technology**
- **Theoretical Computer Science**
- **Visualization and Interactive Graphics**

- Substantially deeper knowledge
- Insights into current research and development
Connection to Current Research

• Each track is directly connected to research groups at KTH active in current international research
  
  • All research areas at the School of Electrical Engineering and Computer Science:
    https://www.kth.se/en/eecs
  
  • Research funded by various agencies and foundations (VR, ERC, KAW, EU, etc.)
  
  • Opportunity to work on cutting-edge research as part of your Master's thesis
  
    • Master's students co-author scientific papers in international conferences and journals!

Boost your CV!
Specializations 1–4

- **Cognitive Systems**
  - Computer vision, robotics, conversational systems, speech technology

- **Data Science**
  - Machine learning, natural language processing, information retrieval, probabilistic graphical models

- **Interaction Design**
  - Human-computer interaction, user-centred design

- **Scientific Computing**
  - Physical simulations, supercomputers, high-performance computing, parallel/brain-inspired systems, visualisation
Specializations 5–8

- **Security and Privacy**
  - Integrity, cryptography, system security

- **Software Technology**
  - Software engineering, DevOps, parallel and distributed computing, programming languages, compilers

- **Theoretical Computer Science**
  - Complexity theory, cryptography, formal methods

- **Visualization and Interactive Graphics**
  - Information visualisation, graphics with interaction, game development
Track Details

Choose at least 7.5 credits

DD2424 (7.5) Deep Learning in Data Science

DD2437 (7.5) Artificial Neural Networks and Deep Architectures

DT2140 (7.5) Multimodal Interaction and Interfaces

Choose One

DD2418 (6.0) Language Engineering

DT2112 (7.5) Speech Technology

DT2119 (7.5) Speech and Speaker Recognition

DT2151 (7.5) Project in Conversational Systems

DD2421 (7.5) Machine Learning

DD2424 (7.5) Deep Learning in Data Science

DD2410 (7.5) Introduction to Robotics

DD2423 (7.5) Image Analysis and Computer Vision

P3 Spring 2021

P4 Spring 2021

P1 Autumn 2021

P2 Autumn 2021

Figure 1: CSCS — Cognitive Systems
Figure 2: CSDA — Data Science
**Track Details**

Choose at least 15.0 credits

- **DH2400 (7.5)**  
  Physical Interaction Design and Realization

- **DH2321 (6.0)**  
  Information Visualization

- **DH2632 (3.0)**  
  Human-Computer Interaction, Research Seminars

- **DH2642 (7.5)**  
  Interaction Programming and the Dynamic Web

- **DT2140 (7.5)**  
  Multimodal Interaction and Interfaces

- **DH2408 (6.0)**  
  Evaluation Methods in Human-Computer Interaction

- **DH2413 (9.0)**  
  Advanced Graphics and Interaction

- **DM2630 (9.0)**  
  User Experience Design and Evaluation

- **DH2628 (7.5)**  
  Interaction Design Methods

- **DH2629 (7.5)**  
  Interaction Design as Reflective Practice

P3: Spring 2021  
P4: Spring 2021  
P1: Autumn 2021  
P2: Autumn 2021

**Figure 3: CSID — Interaction Design**
Track Details

Choose one

- DD2365 (7.5) Advanced Computation in Fluid Mechanics
- DD2437 (7.5) Artificial Neural Networks and Deep Architectures
- DD2257 (7.5) Visualization

DD2363 (7.5) Methods in Scientific Computing

- P3 Spring 2021

DD2356 (7.5) Methods in High Performance Computing

- P4 Spring 2021

DD2444 (7.5) Project Course in Scientific Computing

- P1 Autumn 2021
- P2 Autumn 2021

Figure 4: CSSC — Scientific Computing
Track Details

Choose two

DD2525 (7.5) Language-based Security
DD2448 (7.5) Foundations of Cryptography
DD2443 (7.5) Parallel and Distributed Computing
DD2496 (7.5) Privacy Enhancing Technologies

Choose one

EP2510 (7.5) Advanced Networked System Security
DD2497 (7.5) Project Course in System Security

DD2520 (7.5) Applied Cryptography

P3 Spring 2021
P4 Spring 2021
P1 Autumn 2021
P2 Autumn 2021

Figure 5: CSSP — Security and Privacy
Figure 6: CSST — Software Technology

Master's Programme in Computer Science

2020-08-20
Figure 7: CSTC — Theoretical Computer Science
Track Details

Choose at least 18.0 credits

- DH2257 (7.5) Visualization
- DH2650 (6.0) Computer Game Design
- DH2321 (6.0) Information Visualization
- DH2323 (6.0) Computer Graphics and Interaction
- DH2413 (9.0) Advanced Graphics and Interaction
- DH2320 (6.0) Introduction to Visualization and Computer Graphics
- DD2470 (6.0) Advanced Topics in Visualization and Computer Graphics

Figure 8: CSVG — Visualization and Interactive Graphics
Master's Thesis

• Essential part of your *in-depth studies* in a specialised field

• Think about and *plan your specialisation track and Master's thesis as an integrated whole*.

• Essential requirement: *scientific novelty and significance*

• *How to find a good thesis project?*
  
  • Contact professors and researchers whose research you find particularly interesting
  
  • Look at the [KTH Degree Project Portal](#)
  
  • Contact companies, government agencies and organisations
  
  • Look at opportunities to carry out your thesis project abroad

E.g., cannot merely consist of software development
Welcome!

Leverage your opportunities!

Enjoy the journey!
Disclaimer: these are personal recommendations based on my own experience.

• Become skilled at time management, use calendars effectively
  • The number and frequency of assignments can be high (especially in Autumn, year 1); without excellent scheduling, the workload can become overwhelming.

• It often pays off to start planning early.
  • Example: to find Master's thesis (starting January 2022), start contacting professors and companies in October/November 2021.

• Communicate early, and don't rely on immediate responses.
  • Example: an exam starts at 14:00. Asking for an explanation of a subject or exercise in an email sent at 10:30 the same morning is too late; it would normally be infeasible for the teacher/assistant to respond before 14:00.