**The specialisation in Algorithms enables you to:**

* Deal with computational problems where efficiency and scalability is crucial, for example optimization problems and big data analysis
* Formulate real-world problems as algorithmic ones, analyze the time complexity of algorithms, and predict their performance in a large scale setting
* Recognize computationally hard problems and apply techniques for dealing with them in practice
* Devise and implement new, efficient data structures and algorithms for problems based on known algorithms for related problems and on general techniques for designing algorithms
* Suggest suitable computing architectures for large-scale computations

**Career prospects**

Algorithmic skills are typically desired by large mutinational IT brands, and by small innovative start-ups developing new technologies. Many successful IT companies emphasize algorithmic skills when hiring. For example, [Google released a list of key skills for engineers](https://www.google.com/about/careers/students/guide-to-technical-development.html), and many of these are trained in this specialization, in particular:

* Develop logical reasoning and knowledge of discrete math
* Develop strong understanding of Algorithms and Data Structures
* Learn parallel programming.
* Practice your algorithmic knowledge and coding skills

**Prerequisites**

The are no formal requirements for the specialisation, but students are expected to know:

* Intermediate Programming Skills
* Discrete mathematics
* Basic algorithms and data structures

If you do not have knowledge within these areas before starting the specialisation, you can choose [Introductory Programming](https://mit.itu.dk/ucs/cb/course.sml?course_id=1738481&mode=search&goto=1442394345.000), [Programming Workshop](https://mit.itu.dk/ucs/cb/course.sml?course_id=1738510&mode=search&goto=1442394345.000) or the Foundations of Computing courses ([Discrete Mathematics](https://mit.itu.dk/ucs/cb/course.sml?course_id=1738498&mode=search&goto=1442394158.000) and [Algorithms and Data Structures](https://mit.itu.dk/ucs/cb/course.sml?course_id=1885039&mode=search&goto=1479840548.000)) for your elective on the first or second semester.

**Project supervisors**

The following members of faculty have teaching or research experience that relate to the specialisation. You can contact them if you want to pursue the specialisation's topic area in a project or in your thesis.

* [Rasmus Pagh](http://www.itu.dk/people/pagh) (similarity search)
* [Thore Husfeldt](http://www.itu.dk/people/thore) (exact algorithms for hard problems)
* [Riko Jacob](http://www.itu.dk/people/rikj) (algorithm engineering, big data)
* [Rune Møller Jensen](http://www.itu.dk/people/rmj) (optimization algorithms)
* [Troels B. Sørensen](http://www.itu.dk/people/trbj) (game AI, algorithmic game theory)
* [Martin Aumüller](http://www.itu.dk/people/maau) (similarity search, bike routing)

Example thesis: [Scalable learning through linearithmic time kernel approximation techniques by Johan von Tangen Sivertsen.](http://www.itu.dk/people/jovt/FastKernel.pdf)

**Specialisation contact person**

[Rasmus Pagh](http://www.itu.dk/~pagh/).

Contact Rasmus if you want to know more about the specialisation contents or its prerequisites.