

PhD position in probability, analysis and AI

Main advisor: Pierre Nyquist.

Doctoral program: Mathematics / WASP Graduate School.

Chalmers University of Technology

Chalmers University of Technology in Gothenburg has grown to become one of Europe's leading technical and engineering universities, as well as a key center of intellectual talent and innovation. It is one of the premiere technical research and learning institutions in Sweden and home to students, researchers and faculty from around the world. The research and education covers a wide area including natural sciences and all branches of engineering, as well as in architecture, industrial management, urban planning, history and philosophy.

The Department of Mathematical Sciences has about 200 employees and is one of the largest departments of mathematical sciences in the Nordic countries. The department consists of three divisions: Algebra and Geometry, Analysis and Probability, Applied Mathematics and Statistics.

Job description

The goal of this project is to contribute to our understanding of the mathematical principles underlying modern methods for machine learning and artificial intelligence. Despite the enormous success of such methods in a wide range of application areas, a satisfying understanding of the underlying fundamental properties is still lacking. The successful candidate will pursue a PhD project on the mathematical foundation of machine learning. There are several possible directions for the project and this will be decided together with the student; topics of interest include, but are not limited to, analysis of learning algorithms, generalisation properties of deep learning methods, non-convex optimisation, stochastic networks and learning on graphs, stochastic control, interacting particle systems, Monte Carlo methods, and the use of ideas from statistical physics in the learning context. A central theme will be the use of tools from probability theory, and related areas, to study topics within machine learning.

Students with a strong background in mathematics in general, and an interest in topics related to machine learning, are encouraged to apply. There are no formal requirements about previous experience in specific areas; if you have questions about how your background and interests might fit you are welcome to reach out via email.

The position is a time-limited, full-time, five year position starting August 2024 or at an agreed upon date. The position is fully funded for four years and will be extended to five years by assigning teaching duties. It also includes generous travel support and possibilities for longer research visits abroad. The position is financed within the Wallenberg Autonomous Systems and Software Program (WASP), and the student will participate in the WASP graduate school. Through this program the student will have a wide variety of opportunities to interact with other researchers and industry collaborators in AI, ML, and statistics, including events such as conferences and PhD courses; for more information about WASP see <https://wasp-sweden.org/graduate-school/ai-graduate-school-courses/>.

Within the Department of Mathematical Sciences at Chalmers and the University of Gothenburg, the successful candidate will be part of vibrant and diverse groups in Probability and Analysis, and Applied Mathematics and Statistics. There will also be opportunities for interactions with activities and members

of Chalmers AI Research Center (CHAIR), and researchers in other departments, such as Computer Science and Electrical Engineering, with an interest in the theory and applications of AI.

WASP

Wallenberg AI, Autonomous Systems and Software Program (WASP) is Sweden's largest individual research program ever, a major national initiative for strategically motivated basic research, education and faculty recruitment. The program addresses research on artificial intelligence and autonomous systems acting in collaboration with humans, adapting to their environment through sensors, information and knowledge, and forming intelligent systems-of-systems.

The vision of WASP is excellent research and competence in artificial intelligence, autonomous systems and software for the Swedish industry.

Read more: <https://wasp-sweden.org/>

Application

Information TBA in the winter of 2023/2024; deadline will be in the Spring of 2024.

General information

Type of employment: Temporary position longer than 6 months.

Contract type: full-time.

First day of employment: 1 August 2024 or at an agreed upon date.

Contact: Pierre Nyquist, Associate Professor, Email: pierren@kth.se

Application Submission Deadline: TBA.