

WASP/AI/Math Policy document

1 Background

WASP is a program to support excellent research and competence in artificial intelligence (AI), autonomous systems and software for the benefit of Swedish industry.

As discussed in central WASP documents the initiative to support AI has two components AI/MLX and AI/Math. The former supports Machine Learning (ML), Deep Learning (DL) and other AI, including explainable AI (X). We here define the role of WASP/AI/Math.

2 Mission of WASP/AI/Math

AI is currently transforming our society and the aim of AI/Math is to create a solid mathematical base to make AI, in the long term, more efficient, reliable, and safe. To this end the AI/Math initiative supports

Novel mathematics contributing to the understanding and development of AI.

The foundations of AI are largely uncharted territory. Our aim is to contribute to a deeper understanding which is needed to move beyond the present uses of AI. We also hope, and expect, that this will improve our understanding of science in general, and of mathematics.



The aim is to support activities where the interest in mathematics goes clearly beyond creating a working application. We believe that new mathematics is needed for a deeper understanding of the possibilities and shortcomings of AI. This understanding is instrumental for the long term development of AI, and will allow Sweden to compete on the global AI arena as a major contributor.

History tells us that mathematics from seemingly unrelated areas can give new insights through unexpected connections and thus we expect to have projects from very diverse areas of mathematics. AI/Math will make open calls where applicants are free to propose any topic and argue why it contributes to the mathematical understanding and/or development of AI.

AI/Math is a Swedish initiative and thus, while it is positive to the general interaction of mathematics and AI, the aim is to strengthen such activities within Sweden. The two main instruments we intend to use are:

- the appointment of academic faculty at WASP affiliated institutions;
- a graduate program to produce a significant number of PhDs.

It is also very much the ambition of AI/Math to create a national community of researchers interested in the mathematical foundations of AI. This is achieved by facilitating the exchange of ideas between the member universities of WASP as well as across disciplines closer to the applications.

2.1 Academic recruitments

The aim of AI/Math is to create research environments for studying the mathematical foundations of AI. These environments should continue to exist beyond the WASP program and hence have to be created in close dialogue with the WASP member universities.

Mathematical foundations of AI is an upcoming, young subject and hence most recruitments will be on the assistant professor level. With the clear focus of AI/Math on mathematical foundations one natural place for the created environments are within the mathematics departments at WASP affiliated universities. Taking into account the interdisciplinary nature of the research program, AI/Maths also welcomes the creation of mathematically oriented groups in other departments.

2.2 The PhD students

AI/Math aims at producing a new generation of AI researchers. The graduate program will deliver PhDs that have a strong mathematical expertise and an understanding of at least one application area of AI. These PhDs will contribute to future development of AI in industry and in academia.

During their time as graduate students they will also build bridges between the mathematics departments and other university departments as well as industrial partners of WASP. To create a stimulating environment of PhD-students within AI/Math some of these students will hence be affiliated with departments other than mathematics.