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WASP—HS

The Wallenberg AI, Autonomous Systems and Software Program - Humanities and Society

2023

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Executive Summary

The Wallenberg AI, Autonomous Systems and Software Program – Humanities and Society (WASP-HS) is a ten-year research program running from 2019-2028. The vision of WASP-HS is to foster novel interdisciplinary knowledge in the humanities and social sciences about AI and autonomous systems and their impact on human and social development. WASP-HS provides a unique platform for cutting-edge research, expertise and competence building in the humanities and social sciences through strategic recruitments with generous recruitment packages, building the multidisciplinary WASP-HS research network and community, fostering new capacity through the Graduate School, and by engaging the public and private sectors in research, in the dialogue on and development of future AI, as well as its implementation into society. Together with societal actors, WASP-HS contributes to the development of innovative humane technologies and their transformative interaction with society.

The program has expanded substantially since the 2021 status report, and the main goals for the period 2019-2023 in terms of strategic recruitments for capacity building have been achieved: The Graduate School has currently 93 students, of which 52 are WASP-HS funded, organized into three cohorts (the goal was 50), eleven career positions have been filled (the goal was 10), and six internationally recruited Guest Professors are employed (the goal was six). The recruited Guest Professors bring expertise in philosophy, social psychology, museum studies, law, and communication studies; the junior faculty brings expertise in topics including law, political science, and human-AI interaction. To further build capacity within the WASP-HS research network, a Research Leadership Program was launched for the recruited junior faculty (referred to as Assistant Professors). Both recruited faculty and project leaders are engaged in outreach activities such as the Community Reference Meetings (CRM) and the annual conference AI for Humanity and Society.

Currently, a total of 111 Principal Investigators (PIs) and co-PIs across 14 universities and 1 research institute participate in the program leading 28 research projects directly funded by MMW and MAW and 27 research projects directly funded by WASP-HS. In addition, 11 research projects are affiliated with the program.

While the research within WASP-HS is profoundly interdisciplinary, this is extended further through collaborations with other Wallenberg programs. A graduate school course is provided in collaboration with WASP; WASP/WARA Media and Language collaborated on one CRM and is as research infrastructure accessible for WASP-HS researchers; six collaborative projects with DDLS are receiving seed-funding from DDLS for projects starting in 2023, and education initiatives are collaboratively developed with WASP through the WASP-ED program.

Overall, the growing interest of the program is evident by the growing number of people that in the last two years subscribed to the external newsletter and started following WASP-HS on social media.

During its initial five years, the program has had substantial impact on the development of humanities and social sciences research on AI in Sweden towards research of the highest international quality and societal relevance. The program provides Sweden with the basis to take an internationally leading role in this field of research and will further position the area during the coming five-year period when tangible research outputs will be substantial, not the least in terms of graduated researchers.

WASP-HS Vision and Strategy

The vision of WASP-HS is to foster novel interdisciplinary knowledge in the humanities and social sciences about AI and autonomous systems and their impact on human and social development. WASP-HS enables cutting edge research, expertise and competence building in the humanities and social sciences. As such, WASP-HS contributes to the development of innovative humane technologies and their transformative interaction with society.

The Mission of WASP-HS is to:

- foster excellent research and expertise to address the impact and opportunities of AI and autonomous systems for humanity and society
- ensure strong international relevance and realizing human values of curiosity, creativity, diversity, and care, with commitment to the benefit of Swedish society and industry
- encourage the development of novel conceptual and theoretical frameworks to create new understanding on how AI impacts and is the result of, human choices, learning and creativity, and social and cultural context
- support large-scale transdisciplinary capacity-building and skill development to meet the on-going societal transformation
- facilitate open and continuous dialogue across disciplines and with industry and society about transformative technologies and their consequences
- inspire socially and culturally grounded innovation and sustainable practices and technologies

The Strategic Priorities of WASP-HS are to:

- realize academic excellence by establishing outstanding research environments, initiating recruitments of junior faculty and guest professors, running a dedicated national graduate school, and organizing outgoing postdocs, repatriation, and international exchange
- provide social, cultural, existential and ethical outlooks on next-generation AI and autonomous systems
- develop national and international networking and long-term collaborations
- create synergies through the cultivation of innovative inter-project collaboration and methodological cross-fertilization
- generate the development of unique cross-faculty courses and programs that will train new generations of academics and professionals
- initiate cross-faculty, cross-university, and cross-sectorial activities and the sharing of emerging best practices
- promote collaboration with industry, and public, cultural and creative sectors on sustainable technology to advance mutual learning

Program Overview

The instruments implemented in order to achieve the vision and mission are designed to advance new interdisciplinary knowledge and research in the humanities and social sciences on the subject of artificial intelligence and autonomous systems and their impact on human and social development. They have to meet the challenges in research, in building competence, and in strategic relevance for society. The instruments include an excellent research program, a national graduate school, capacity building and recruitment, outreach and collaboration with society, international partnership and activities, as well as cross instrument activities. The instruments are presented in more detail in the following sections.

Research Program

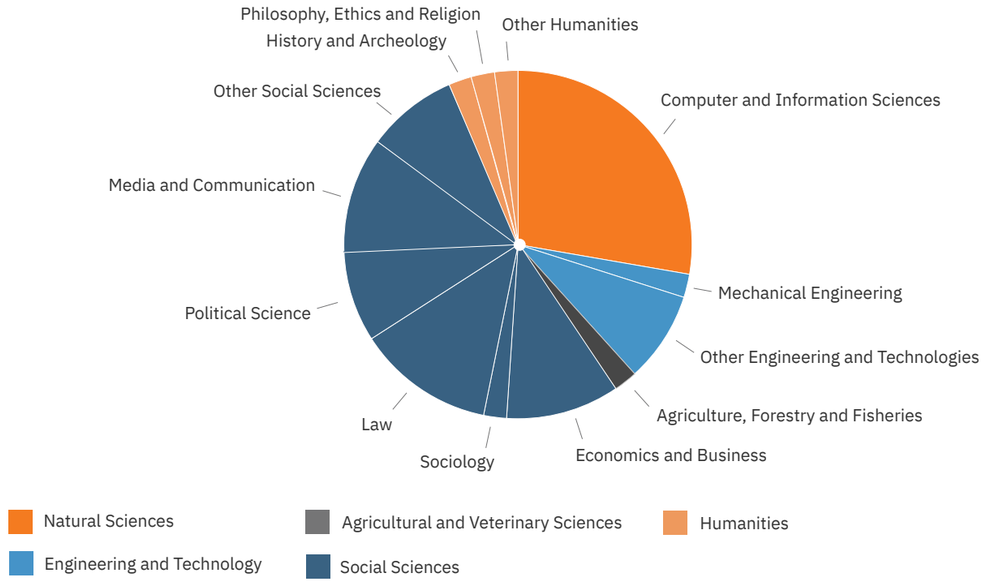
The research program targets the multidisciplinary challenges with the current research and development of AI, in particular, to substantially strengthen the humanities and social sciences research impact on AI and autonomous systems. The program adopts a broad scope to encompass a multitude of perspectives on AI-related challenges across the humanities and social sciences, to leverage research currently conducted at Swedish universities and research institutes, while supporting the development of excellent and internationally influential interdisciplinary research environments across Swedish universities and beyond.

Graduate School

The WASP-HS graduate school addresses the challenges and consequences of the imminent

Overview of WASP-HS organisation and instruments

Distribution of PhD students' research field in cohort 1 and 2



technology shift caused by the introduction of autonomous systems and AI in society. The goal is to train PhD students from multiple fields to allow them to be part of an internationally competitive co mmunity with training in philosophy, social science, policy research, organizational science, psychology, and other humanities and social sciences disciplines, together with a sound knowledge of core AI issues. The courses offered within the academic program aim to give all PhD students within WASP-HS a common ground for their research. Since the students bring a multitude of disciplinary backgrounds, an important goal of the courses is to provide knowledge and skills from areas that they have not already studied, and relating this to AI.

The graduate school builds the foundation for future ground-breaking research and is establishing a modern cutting-edge basis for (1) how humanities and social sciences can inform research in AI and autonomous systems, (2) how AI techniques can be used to advance the humanities and social sciences, and (3) studying the consequences of AI and autonomous systems. One goal is to provide new forms of understanding of the relation between AI and autonomous systems and individuals as cultural beings.

The WASP-HS academic program for PhD students consists of eight core courses, seminars, an annual summer school aimed at developing thematic methodological competences and to increase practical skills that transcend discipline borders, as well as an annual winter conference where students present and discuss their research. All students are required to take a minimum of four courses and attend the summer schools and winter conferences.

Capacity Building and Recruitment

The instrument for capacity building and recruitment aims to develop expertise and build knowledge and skills in the humanities and social sciences across Sweden through the international recruitment of both younger researchers and established researchers who are already influential within the WASP-HS domains. This is being achieved by offering packages that are attractive by international standards.

Assistant Professors

The topics for the strategic recruitment packages targeting assistant professors were selected to cover a broad range of topics with transformative potential aligned with the vision of WASP-HS, connected to local research environments with the aim to also strengthen and develop the research environments in which they enter. As a consequence, the recruited Assistant Professors are establishing and developing their research groups in multidisciplinary fields directly relevant to generate scientific knowledge of the impact and consequences of AI and autonomous systems for humanity and society.

WASP-HS Research Leadership Program

The aim of the WASP-HS Research Leadership Program is to support and facilitate the Assistant Professor's career path towards becoming the excellent research leaders that both future academia and society need. The leadership program is scheduled to run for approximately five years and is intended to work as an extension and complement to other leadership programs and activities in their in local environments. To ensure community building and embedding, the gatherings of the Research Leadership Program are usually either co-located or arranged in conjunction with other WASP-HS activities such as the summer school or the annual AI for Humanity and Society conference. All modules of the Research Leadership Program feature invited guest speakers with acclaimed expertise and knowledge on respective topics.

An important part of the Research Leadership Program is the mentoring program. In 2022, all Assistant Professors were matched with a PI within WASP-HS to form a mentoring partnership. This gives young, future research leaders a sounding board to share ideas, experiences and – if needed – frustrations with. This will also form a natural way of expanding the Assistant Professors' academic and scientific networks.

Guest Professors

The topics and candidates for strategic recruitment packages targeting internationally leading experts were identified in collaboration with Swedish universities and research institutes. The final six candidates and their topics were selected with the aim of substantially strengthening the Swedish interdisciplinary research in the humanities and social sciences on AI and autonomous systems.

Postdoctoral Program

WASP-HS provides the opportunity for eligible candidates involved in WASP-HS to apply for postdoctoral positions. It is required that all applicants must have been a WASP-HS PhD student (including affiliated PhD students) or in another way directly involved in a WASP-HS project.

WASP-HS will in addition provide an opportunity to apply for funding for a two-year repatriation period, at one of the WASP-HS universities in Sweden, after returning from postdoctoral positions abroad. As a compulsory part of the repatriation WASP-HS will offer a training program to ensure both community building and continued career development.

Outreach and Collaboration with Society

WASP-HS aims to strengthen the link to the societal context in which the program operates. The instrument for collaboration with industry and society consists of three main areas of activities: outreach communication, dialogues with stakeholders and collaborative research calls.

Information about the program, including news, open calls and positions, upcoming events and more is communicated through various channels. This includes the WASP-HS website, the social media platforms X (Twitter) and LinkedIn, newsletters, press releases and direct contact via e-mail.

Different events open to participants from outside the WASP-HS program foster the dialogue with stakeholders. The main forums are the annual AI for Humanity and Society conference, and 2-3 Community Reference Meetings (CRMs) per year, which are focused on different themes considered challenges in society, engaging a broad audience across society. The Community Reference Meetings are organized as online events.

Collaborative research calls are aimed at facilitating research collaborations across Swedish universities and disciplines, especially supporting research topics requiring a multidisciplinary approach, and with organisations external to academia. Ultimately, the

scope is to create an interdisciplinary community around the projects with a clear and high societal impact.

International Partnerships and Activities

The establishment of partnerships with internationally leading universities and international activities are instruments for building the international profile of the program. Activities include PhD students funded by WASP-HS spending a semester abroad and doing study visits, and postdoctoral scholarships in collaboration with institutes whose research focuses on the new frontiers at the interface between artificial intelligence and autonomous system and humanities and social sciences.

Contacts are established with Stanford University, Massachusetts Institute of Technology (MIT) and Nanyang Technical University (NTU).

The Guest Professors recruited by the program are also expanding the networks at various places around the world.

Cross-Instrument Activities

In order to create synergies between and among the various projects and researchers within the program, certain activities are aimed at working across the instruments and further building on results generated by the different instruments.

WASP-HS supports cross-project collaboration initiatives by WASP-HS researchers on topics that require a multidisciplinary approach and are relevant for two or more projects within WASP-HS.

To provide cross-program meeting spaces, a series of events and meetings are organised to leverage and highlight WASP-HS's ambitions and vision. These program-wide activities aim to expose researchers to multidisciplinary topics, encourage discussion, and facilitate the development of further joint collaborations across researchers, with the aim of deepening knowledge on AI impact and on cross-disciplinary topics, as well as developing shared methodologies and contributing to research excellence and output.

Massachusetts Institute of Technology logotype, Nanyang Technological University logotype and Stanford University logotype.

Wallenberg Centre for Quantum Technology logotype, The Wallenberg AI Autonomous Systems and Software Program logotype, The Wallenberg AI and Transformative Technologies Education Development Program logotype, Wallenberg Initiative Materials Science for Sustainability logotype.

Wallenberg Program Collaboration

In December 2021, WASP-HS, together with WASP, received a grant of 18,6 MSEK from the Marianne and Marcus Wallenberg Foundation (MMW) to start the Wallenberg AI and Transformative Technologies Education Development Program (WASP-ED). The goal is to significantly increase Swedish universities' capability and capacity to provide current and relevant education in AI and other transformative technologies across disciplines.

The aim of the collaboration between WASP-HS and Data-Driven Life Science (DDLS), a research program hosted by SciLifeLab, is to bridge the humanities and social sciences with the data-driven life sciences.

The collaboration that WASP-HS has with WASP, DDLS and WASP-ED fosters the establishment of a network across researchers in different disciplines. These collaborations provide the opportunity to identify challenges and the hard problems to be solved in research and through collaboration with society and industry, and to develop multidisciplinary research collaborations that will develop new knowledge across the broad field of AI and autonomous systems and their implementation in society.

WASP-HS has been in discussions with WISE and WACQT about future collaborations.

Instrument Achievement Report

Since 2019, WASP-HS has made multiple achievements across the established instruments. Some of the achievements of WASP-HS so far are described below and presented by instrument. For some of the instruments the tangible achievements can be quantified in numbers. For others, achievements represent the societal and theoretical impact of the newly created knowledge.

Main Achievements

- 54 ongoing research projects engaging researchers from 14 universities, and one research institute, targeting research challenges in multidisciplinary collaborations across disciplines, academic institutions, societal organisations and industry.
- The Graduate School has 93 active PhD students across 3 cohorts.
- 6 internationally renowned Guest Professors have been recruited.
- 11 Assistant Professors have been recruited, and an additional Assistant Professor is affiliated with the program.
- A Research Leadership Program has been launched for the Assistant Professors.
- Formal collaboration has been established with Massachusetts Institute of Technology (MIT), Stanford University and Nanyang Technological University. A postdoctoral program in collaboration with MIT has been launched.
- The annual conference AI for Humanity and Society attracts 200-300 attendees each year, from both academia, industry and society.
- Community Reference Meetings on urgent topics for society are held 2-3 times per year.
- Collaborations with sister programs DDLS and WASP have been established.
- A joint educational initiative with WASP through the program WASP-ED has been created to increase interdisciplinary competences in AI, autonomous systems and other disruptive technology.

Research Program Achievements

WASP-HS has established a unique platform that currently engages 111 principal investigators across 14 universities and 1 research institute in Sweden. Their disciplinary backgrounds range across the humanities, social sciences, medicine, science and technology domains with publication outputs in both disciplinary and interdisciplinary venues. The analysis of their interactions in terms of shared publications shows that there are strong connections across disciplines, as described in a bibliometric study conducted in 2023. The research program works as a hub, connecting and facilitating the other program instruments including capacity building and recruitment and outreach and collaboration with society.

WASP-HS is the host for 28 research projects directly funded by Marianne and Marcus Wallenberg Foundation (MMW) and Marcus and Amalia Wallenberg Foundation (MAW). These projects have been expanded with PhD student projects through WASP-HS. Another 11 research projects funded by among other MMW, MAW, the Knut and Alice Wallenberg Foundation (KAW) are affiliated projects. An additional six 1-year projects funded by MMW lead by Ukrainian researchers have been affiliated with the program.

The 11 Topic Leaders who were active at the different hosting universities in defining and forming the recruitment packages for the young researchers, have received support for the facilitation of continued interdisciplinary development of respective topic areas through university-wide activities in line with the WASP-HS vision. The Topic Leaders are also supporting the embedding of the Assistant Professors and Guest Professors at their respective universities.

Some of the projects directly funded by WASP-HS have been aimed at expanding the collaborations across projects and with organisations in society. There are two WASP-HS funded projects within the call for Innovative Collaboration Projects and one project within the call for PhD in Society.

Since WASP-HS started, the discourse about AI's impact on society and humanity has been active across press and media channels, showing the relevance of WASP-HS. WASP-HS scholars are contributing to the public dialogue through presentations in popular venues, blogs and media, both nationally and internationally.

These numbers and the vast scope of the program require a lot of work to create both research synergies and community building among the researchers. The current focus of the program is therefore on the consolidation of research and support of the activities and interaction between all researchers. Hence, the program is in the process of establishing coordinating points at the universities centred around strong research topics.

Graduate School Achievements

The graduate school currently includes 93 PhD students divided into three cohorts of 34, 41 and 18 PhD students respectively. The first cohort started in autumn 2020, the second in winter 2022 and the third in autumn 2023. The first graduates are expected to complete their PhD studies during 2025.

Participation in the graduate courses has been very high and most of the students in the first cohort have taken the mandatory number of courses and attended the summer schools and winter conferences.

The course evaluations have generally been very positive and show that the PhD students have found the courses both useful and interesting. Thanks to a recent agreement between the Directors of the Graduate Schools of WASP-HS and WASP, PhD students are able to attend courses belonging to each program upon approval.

WASP-HS PhD students have arranged seminar series throughout the program. The seminar series are held online and organised as series of four seminars with a common theme. WASP-HS researchers and invited national and international leading scholars present research results, ongoing research, or visions for future directions, followed by an open discussion.

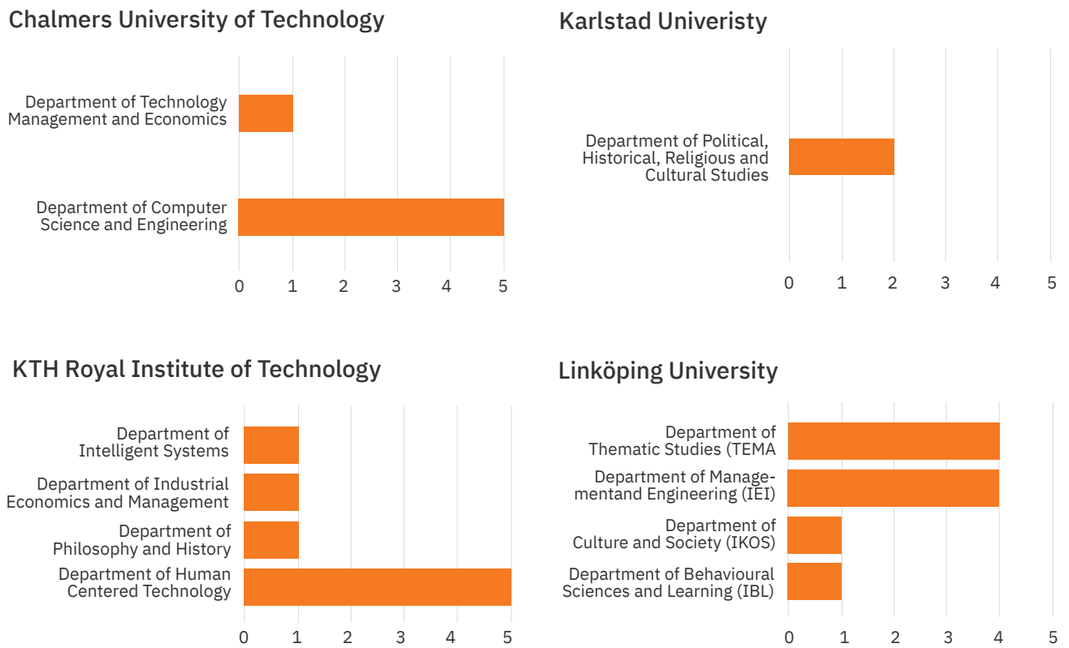
The yearly summer school takes place during August and is organised every year by the WASP-HS PIs of a particular university. In 2021 and 2022 it had the theme energy transition (Umeå University) and social robotics (Lund University), respectively. In 2023, the summer school was organised by KTH Royal Institute of Technology in Stockholm with the topic of management implications of AI. The 2023 summer school allowed the PhD students to discuss and think critically about AI's potential effects on jobs and work processes, management and business strategies, as well as industries and industrial dynamics.

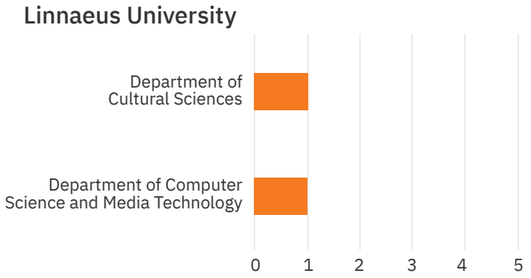
The annual winter conference takes place at the beginning of every year. Each winter conference is hosted by a different university to also allow study visits, and is arranged in the format of a workshop or scientific conference with invited presentations combined with oral and poster presentations by the PhD students. The conference is focused on the research work conducted by the students, which has allowed them to gain practical skills by giving oral and written presentations of their research.

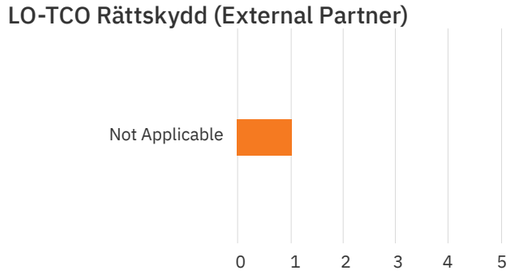
Each student is expected to spend a semester abroad at a relevant research institute. The goal of these trips is that the PhD students should get an opportunity to build an international network as well as to experience research at a different place than their home university and department. This opportunity was delayed due to the Covid pandemic, with the first PhD student spending time at a university abroad in the spring of 2023.

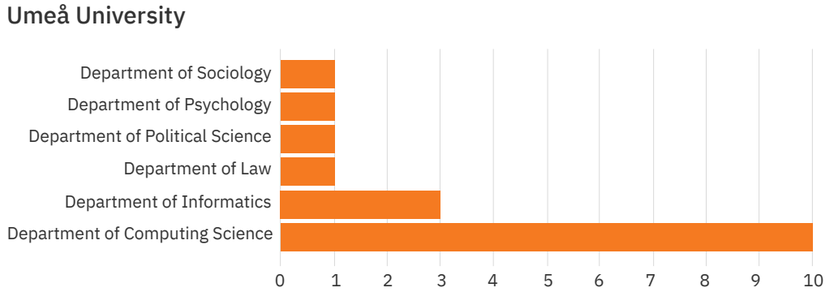
During 2021 a Graduate School Student Council was established. The management of the Graduate School has since had regular meetings with the Student Council to discuss future plans and activities. PhD student representatives have also had the opportunity to meet the Board and the Management Team members during joint Strategy meetings.

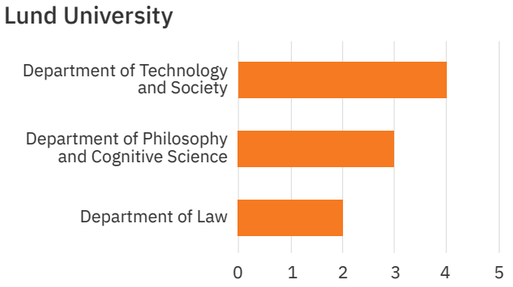
Number of PhD students per Departments at Universities

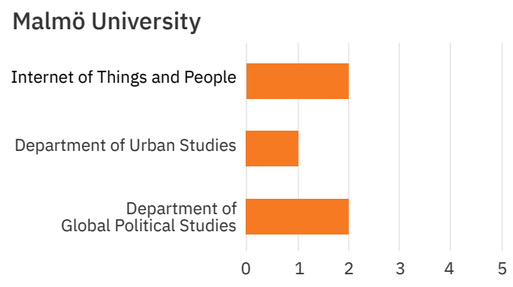


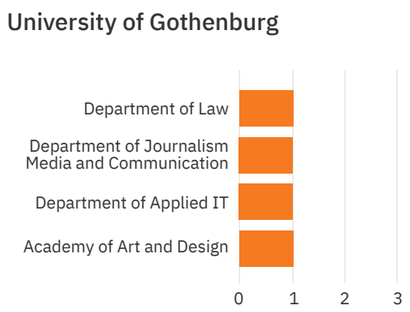


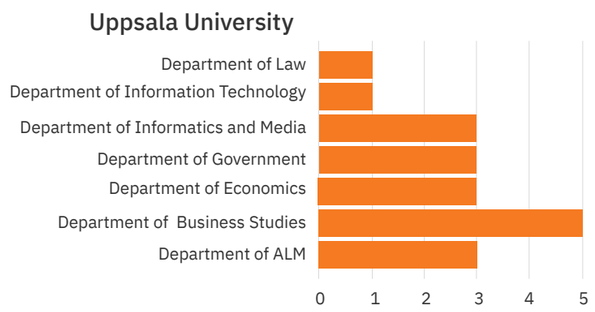


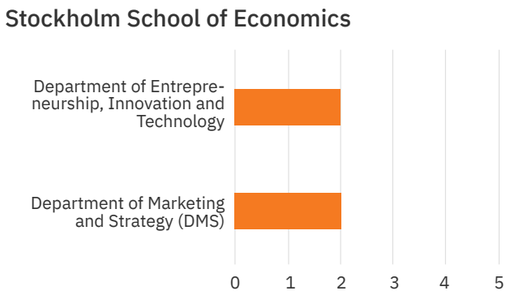


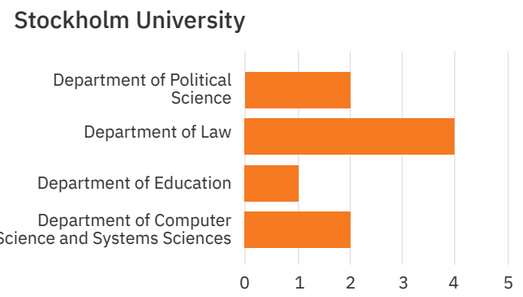


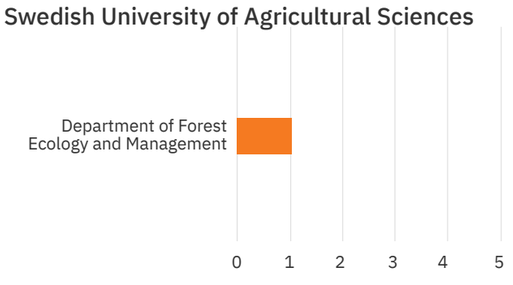


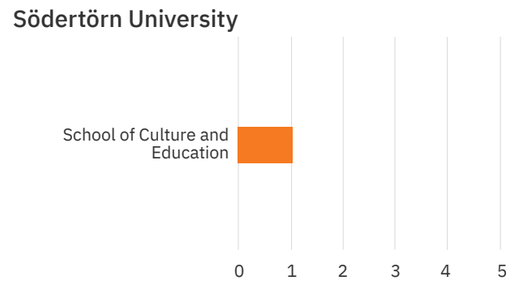












Capacity Building and Recruitment Achievements

In order to develop expertise and build knowledge within the humanities and social sciences across Sweden, WASP-HS has facilitated the recruitments of Assistant Professors and Guest Professors who are contributing to the WASP-HS research network and cutting-edge interdisciplinary research of the program as well as expanding the network internationally. The upcoming Postdoctoral Program will contribute to this as well.

Guest Professors

The evaluation made by external reviewers under the supervision of the Scientific Evaluation Committee resulted in the appointment of six Guest Professors (three women, three men) at Linköping University, Lund University, Umeå University, Uppsala University, and Örebro University respectively. The recruited Guest Professors bring expertise in philosophy, social psychology, museum studies, law and ethics and will utilise their generous recruitment packages to expand the local research environments at their respective host universities, but are also expected to contribute to the national WASP-HS community. They are, or will in the near future be, engaged in the program via activities involving the Graduate School, the Research Leadership Program and the annual conferences of WASP-HS.

Recruitment of Assistant Professors

During 2021 generous recruitment packages were provided to 11 WASP-HS Assistant Professors employed by nine Swedish universities. One additional Assistant Professor, recruited by Stockholm School of Economics from outside Sweden, has been affiliated. Seven of the 11 WASP-HS funded Assistant Professors were recruited from a university different than where they were located at the time; of these, one researcher was recruited from within Sweden and six were recruited from outside of Sweden. The

gender distribution is 7 men (64%) and 4 women (36%). The topics of the recruitment packages were selected to cover a broad range of topics with transformative potential aligned with the vision of WASP-HS. As a consequence, all the Assistant Professors are working in multidisciplinary fields directly relevant to generate scientific knowledge of the impact and consequences of AI for humanity and society. 15 PhD students connected to the recruitment packages were admitted to the WASP-HS Graduate School during 2021.

WASP-HS Research Leadership Program Achievements

WASP-HS develops capacity across the research domains directed towards scholars in different career stages. In particular, the Research Leadership Program (RLP) was launched to support WASP-HS Assistant Professor recruitments, which has made significant contributions by effectively gathering researchers from diverse disciplines, creating synergistic effects, and generating new knowledge relevant to the transformative impact of AI on society.

Six modules covering topics such as leadership, interdisciplinarity, policy and politics, research funding and collaboration with society were arranged as part of the Research Leadership Program. In 2022, all six modules were arranged during four gatherings in Lund, Umeå and Stockholm. Meetings in 2023 were arranged in Stockholm, Krägga and Norrköping.

The Research Leadership Program allows for plenty of group discussions and reflections among the Assistant Professors. The mentoring program facilitates a support system for the younger researchers and provides space to exchange knowledge.

In 2023, the program was evaluated with very positive feedback. The program has facilitated interdisciplinary collaboration, supported personal and professional development of researchers, fostered a sense of community, promoted best practices, enabled knowledge transfer, and engaged with external stakeholders, thus bridging the gap between research and lived realities. The Research Leadership Program has positively impacted the Assistant Professors by strengthening personal development, navigating internal politics, promoting interdisciplinary collaboration, supporting teaching and curriculum development, providing access to top researchers, and facilitating the application of research results in society. To build upon the successes of the Research Leadership Program, and as a result of the evaluation, the second year of the program was focused on more in-depth content.

Postdoctoral Program

The WASP-HS Postdoctoral Program for postdoctoral positions in cooperation with MIT Schwarzman College of Computing is announced on a yearly basis. The first call for the WASP-HS Postdoctoral Program was launched in October 2022 for two postdoctoral positions. This call did not generate any applications which were of the quality that WASP-HS expects from postdoctoral researchers, and therefore no candidates were selected. One of the main reasons for this result is the fact that the call requires prior connection to WASP-HS and at that moment none of the WASP-HS PhD students had graduated and were therefore not yet qualified to apply. The second call for postdoctoral positions opened in October 2023 and the reviewing process is in progress.

Outreach and Collaboration with Society Achievements

Collaborative Research Calls

In 2020 two collaborative research calls were launched: Innovative Collaboration Projects and PhD in Society. In total 3 projects were granted. An evaluation of the design of the collaborative research calls within the program resulted in a fusion and expansion of these two calls. The new call was launched in 2022 under the name NetX: Networking Excellence Projects in the Humanities and Social Sciences for the Study of Consequences and Challenges of Artificial Intelligence and Autonomous Systems. Six out of 24 submitted proposals were funded, engaging a total of 17 researchers.

Outreach Activities

Every year, WASP-HS organises different events to give people within the WASP-HS program, stakeholders, people from academia and the private and public sectors the opportunity to meet. Since the start of the program meeting days and information days, with varying degrees of formality, have been held with important politicians, public and private organisations and industry.

Every year the annual AI for Humanity and Society (AI4HS) conference is organised, and it focuses on different topics of striking interest for the research community, industry and society. The conference is attended by 200-300 participants each year and held in different cities, and has been broadcast online some years.

The most established program model for having structured and regular dialogues with stakeholders is the Community Reference Meetings (CRM), organised two to three time per year. Seven online CRMs bringing together researchers and stakeholders from relevant sectors have been arranged covering different themes relevant for the community. After each Community Reference Meeting a report is published and made available for download on the WASP-HS website.

The outreach communication about the program is done through monthly external newsletters and regular social media updates on X (Twitter) and LinkedIn. As of October 2023, there are 904 people subscribed to the external newsletter, 3092 followers on LinkedIn, and 1483 followers on X (Twitter).

International Partnerships and Activities

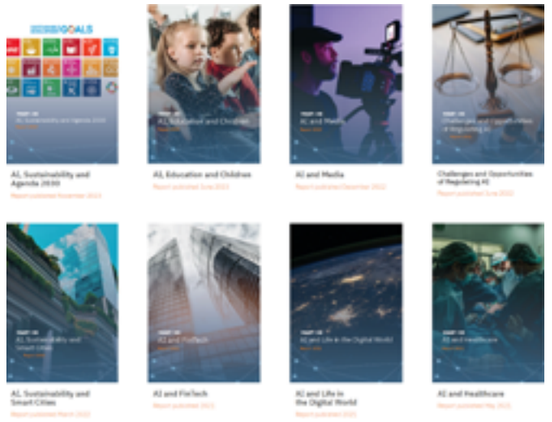
The international postdoctoral program has been reactivated after the pandemic and contacts with Massachusetts Institute of Technology (MIT) and Nanyang Technological University (NTU) have been established. A call for two postdoctoral positions was announced in October 2022, and a second call was announced in October 2023 in collaboration with MIT.

International research visits for PhD Students started during 2023. These visits are initiated by the PhD students and organised through an application to the Graduate School. Due to recent changes to the Swedish migration legislation (July 20, 2021) students from non-EU countries might need to consider shorter stays or to split their period abroad into more than one travel.

The partner universities are further connected to WASP-HS through appointments within the International Scientific Advisory Board.

Many of the researchers within WASP-HS have been recruited from universities and institutes outside of Sweden, including people on all levels of seniority – from professors to PhD students. Six of the Assistant Professors who joined the program during 2021 were recruited from European and North American universities. Furthermore, during 2022 6 Guest Professors affiliated to universities from five different countries have been recruited. This is expected to pave way for study visits and expanding the network to universities internationally.

The annual AI for Humanity and Society conferences always feature keynotes from outside of Sweden, as have several of the winter conferences arranged by the Graduate School. International speakers are also a recurring element at the Community Reference Meetings (CRM).



WASP-HS Community Reference Meeting reports as published on the program website.

In March 2023, a study visit to the San Francisco area was organised for the Board and Management Team, with visits to Stanford University and Berkeley University, Ericsson Research, Apple, Meta, and the World Economic Forum. The visit included conversations with researchers at recently established centres for human-centred AI with similar ambitions as WASP-HS, on their focuses for research, challenges related to interdisciplinary research, and the importance of keeping a holistic view when discussion the impact of AI. The trip allowed for deeper insight into current focuses of some of the most influential actors within the tech industry, and the insight that WASP-HS has established itself as a unique research program, operating at the forefront of the international research community.

Cross-Instrument Activities Achievements

As the program progresses, synergies and actions across instruments are being identified and implemented. WASP-HS facilitates Cross-Project Collaborations, to identify synergies across research topics and to further advance knowledge. So far, 8 Cross-Project Collaborations have been approved. These collaborations allow for an expansion of the networks within the program.

A series of events and meetings have been initiated to leverage and highlight the ambitions and vision of WASP-HS. These program-wide activities have allowed the researchers to engage in discussions and has facilitated the development of further joint collaborations across projects and between researchers. This has led to a deepening of knowledge on AI impact and on cross-disciplinary topics, as well as developing shared methodologies and contributing to research excellence and output. In March 2023, a meeting for Principal Investigators was organised, dedicated to evaluating the program so far, and to prepare for the next phase. The PIs within the WASP-HS program were invited to share their results and thoughts about the future of the research at WASP-HS. The Ukrainian researchers affiliated to the program were invited to give short presentations of their projects. The Principal Investigators highly appreciated the meeting. Plenty of ideas and visions for further expanding and developing the program were discussed, and the participating PIs expressed how much they appreciated WASP-HS as a platform for expanding their research in different ways.

Cross-Program Meeting Spaces

The interdisciplinary profile of WASP-HS is fostered by multiple events that support collaborations across researchers.

Examples of Cross-Program Meeting Spaces

- A term-based and thematic research seminar series (co-organised with the Graduate School)
- A keynote and workshop on trust as a multidisciplinary concept
- A workshop on the topic of multidisciplinary research impact and research excellence
- Principal investigator meetings
- The annual conference AI for Humanity and Society

Alona Natorina, Ukrainian researcher affiliated with WASP-HS, presenting her research at the WASP-HS PI meeting in March 2023.

Wallenberg Program Collaborations

WASP-HS is working with the other Wallenberg programs on a number of joint calls as well as contributing to the development and management of WASP-ED.

WASP-HS and WASP-ED

The joint research program on the development of new disciplinary and interdisciplinary education at Swedish universities on AI, autonomous systems and other disruptive technologies, WASP-ED, is running with work area leaders from both WASP and WASP-HS. WASP-HS researchers are contributing to exploring and developing knowledge on AI as an instrument for grading learning outcomes, large language models in education, a new holistic AI curriculum, and new educational programs and courses addressing areas where current education on AI and its consequences in Sweden is inadequate.

WASP-HS and WASP

Since 2020, WASP-HS organises the Graduate School course Ethical, Legal and Social Aspects of AI and Autonomous Systems together with WASP. This course is mandatory for all WASP-AI PhD students and typically over 100 students across both programs attend each year.

The WASP research infrastructure WARA Media and Language is open to WASP-HS PhD students and researchers. The Community Reference Meeting on AI and Media in October 2022 was designed in dialogue with, and co-organised with, WARA Media and Language. This was a hybrid meeting with roundtables meeting physically in three different locations (EA Games offices in Stockholm, Umeå University and Chalmers University) which was attended by over 80 participants.

WASP arranged a digital career day in March 2023 for WASP and WASP-HS PhD students. The aim of the career day was to increase and exchange knowledge on research and career opportunities by connecting industry representatives with PhD students. WASP-HS maintains a continuous dialogue with WASP, specifically on knowledge exchange regarding the postdoctoral program and discussions regarding joint elective courses and events.

WASP-HS also attended the WASP Industry Days 2023 with a booth and PhD students who had poster presentations.

WASP-HS and DDLS

Six collaboration projects between WASP-HS researchers and DDLS researchers have been provided seed-funding from DDLS to establish collaboration.

A networking meeting between WASP-HS and DDLS was arranged in June 2022 at SciLifeLab in Stockholm. The day consisted of thematic parallel networking sessions, as well as a study visit to SciLifeLab. At the meeting, the first WASP-HS and DDLS Joint Call for Seed Money was launched. Following a joint review process by both programs, the decision was taken to fund three projects, starting in January 2023. For the second call an online networking meeting was organised in February 2023 and the deadline for applications was in March. Three projects were approved that were scheduled to start in September 2023.

Research Findings and Progress

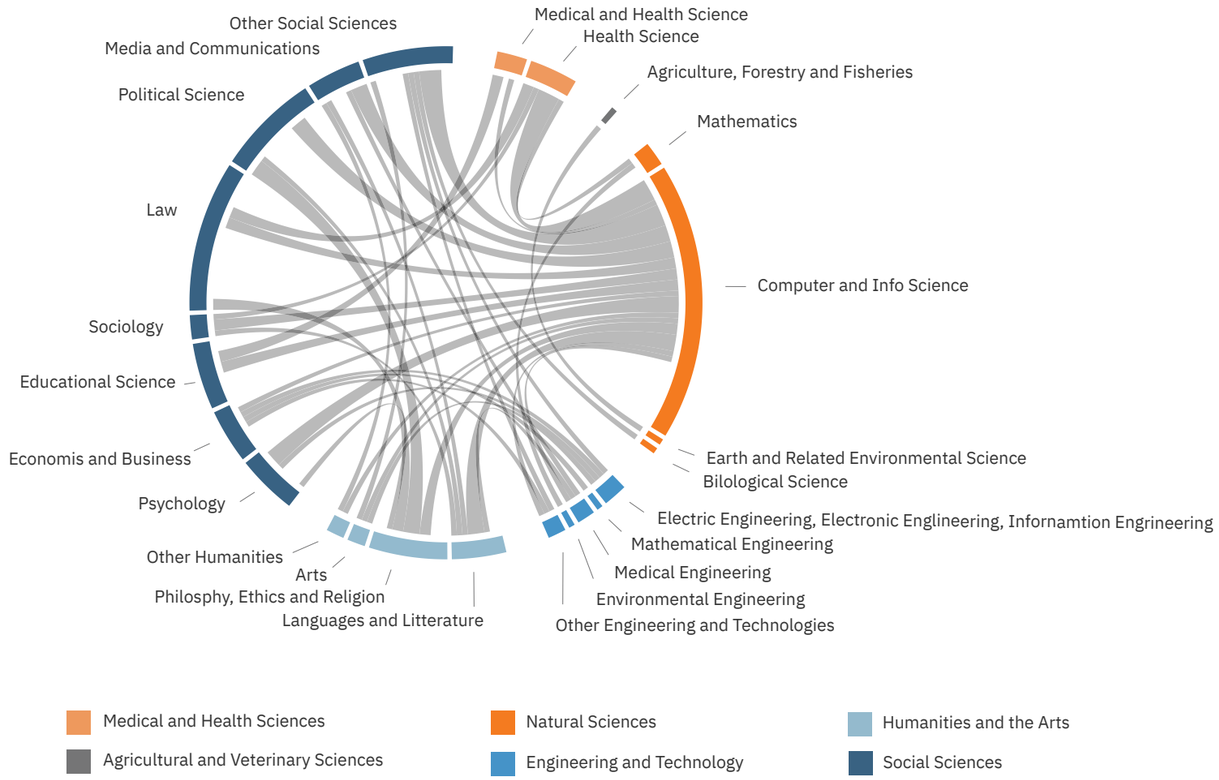
Presentations of findings by the Principal Investigators of the research projects, representative scientific articles provided by project members, a bibliometric evaluation and interviews with the PIs together present an overview of the research outcomes of the WASP-HS program so far.

WASP-HS has yielded a range of significant results and contributions, showcasing the excellence and impact of research and development efforts. Research has critically examined societal and human impact of AI in a broad range of domains across the humanities and social sciences, including higher education, service robots, cultural influences on learning outcomes, accountability in financial markets, trust in autonomous systems, and inclusivity in AI tools.

The WASP-HS researchers have reported 197 scientific publications, demonstrating the depth and breadth of research findings. Research is disseminated through high-impact academic journals and scientific conferences, contributing to the body of knowledge in a broad range of disciplinary and interdisciplinary fields. Moreover, research has also been communicated through reports contributing to the public debate, and to the reflection on and evaluation of the organization of public services when AI and autonomous systems are embedded in decision making processes [1, 2].

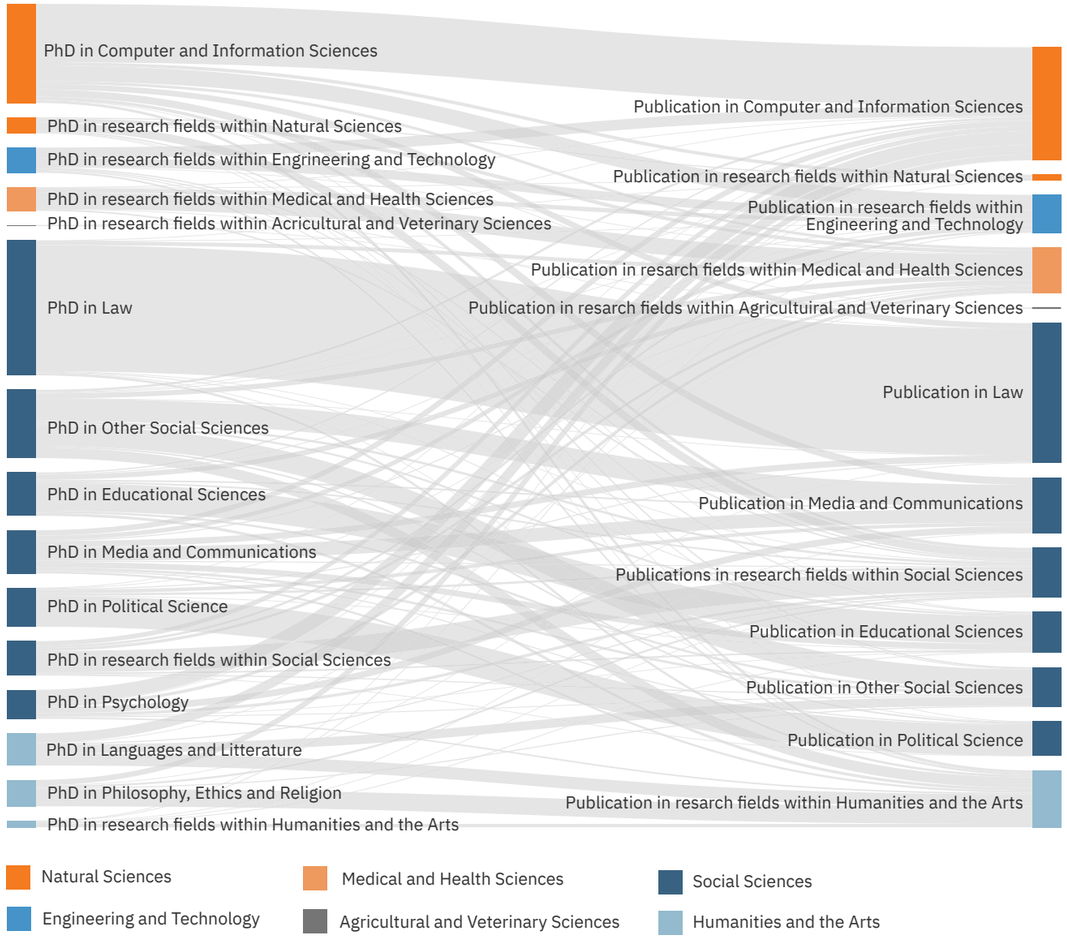
A bibliometric analysis of the years 2019-2022 provided an overview of the multidisciplinary work of the project PIs across disciplines.

Project collaboration network by academic background - cross-domain interactions



Collectively, WASP-HS research has advanced the understanding of the ethical, social, legal, and technological dimensions of AI in domains across societal and research domains. Research results have offered valuable insights for interdisciplinary collaboration, responsible AI development, and the promotion of inclusive and ethically sound practices. While valuable results have been communicated during the initial five years, substantial results are yet to be expected, considering some research projects are still in their early stages, and the pace of publication processes.

PhD research field of researchers involved in WASP-HS to publication research field



The following are examples of research findings by WASP-HS PhD students, Assistant Professors, project PIs, and from collaborations between projects:

Governance, Equality and Consequences of AI on Work

- Global Governance of AI: Justice requires that governance mechanisms not be limited to AI technology, but incorporated into a range of basic institutions. Rather than offering a substantive theory of democratic and fair AI governance, the authors propose a theoretical framework that sets up certain normative boundary conditions for a satisfactory account[3].

- Gendered AI: An analysis of AI policy documents shows that some, but far from all, bring about articled focus on gender and equality. In these, the identified problem is a lack of knowledge and information, which is assumed could be met by more knowledge and information, reinforcing the perspective that AI and AI innovation is neutral[2].

- The Future of Work: The distinction between future scenarios of human-replacing, human-augmenting, and human-stunting is discussed, calling for more empirical studies of what happens when humans start collaborating with AI in workplaces. The role of political institutions in promoting a particular scenario is pointed out for future work[4].

Human-AI Interaction

- Ethical Sensibility in Design: Research highlighted the ethical sensibility that influences the design process, challenging the notion of ethics as a detached set of principles. The results emphasized the cultivation of ethical awareness and the need to question and change ingrained design practices[5].

- Equality, Justice and Power relating to Robots: Focus is on the importance of building trusting relationships, programming robots for ethical behavior, the impact on equality and justice discussions and recognition in the robotics community. Feminist perspective on Human-Robot Interaction (HRI) won best paper award[6].

- Accessibility and User Experience: A research study focused on making autonomous systems, such as self-driving buses, more accessible and enjoyable for individuals with disabilities. Design proposals were developed and practical suggestions made for improving the user experience and addressing technical limitations[7].

- Social Impact of Autonomous Vehicles: A study examined the social consequences of testing and adopting self-driving cars. The results revealed the burden placed on human drivers to navigate the mistakes made by autonomous vehicles, highlighting the need for a comprehensive understanding of the changing dynamics of driving[8].

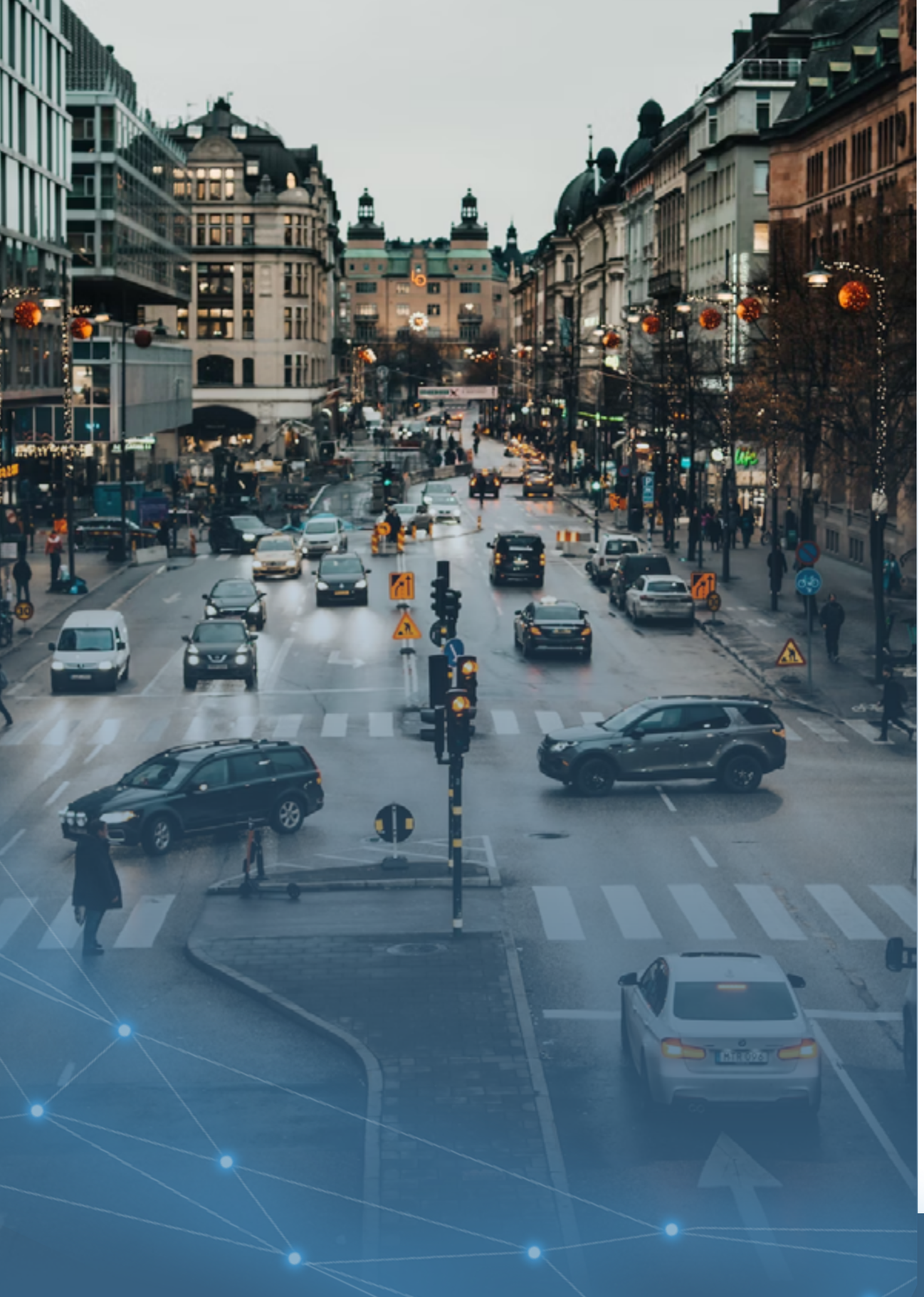
- Conversational Agents: AI-driven chatbots become increasingly sophisticated, the study sheds light on the real-world implications of the Turing test and how it affects human-human interactions. The research emphasizes the importance of transparency in developing AI-driven conversational systems and their potential societal repercussions[9].

AI as Instrument

- AI in Cultural Heritage Organisations: A study provides an analysis of professional and organisational processes concerning the implementation of AI/ML methods and tools. The results suggest that a national AI/ML strategy might be helpful, as would sharing of knowledge, expertise, and potentially personnel and resources to move beyond the constraints organisations face in implementing AI/ML[10].

- AI in Creative Contexts: Studies explored the challenges and socio-cultural implications of using generative AI in creative fields. The results included practical tools, guidelines, and discussions on topics such as AI-generated content, intellectual property issues, and the intersection of AI and the artistic imaginary[11].

- AI for Discourse Analysis: A study explored the use of Natural Language Processing for identifying change of discourse in society. Contributions have been made to the study of ontology, rhetoric and psychology of discourses in the interstice of social and traditional media, especially related to far-right rhetoric in Sweden, the US, and Europe[12].



Program Impact

During its initial five years, WASP-HS has built a unique platform and functioned as a transformative force that has cultivated a cross-national awareness and effort to drive the international forefront of research on the impact and potentials of AI and autonomous systems for the benefit of society and humanity. The motivation, vision, and dedication of WASP-HS researchers has pushed the boundaries of research, delivered meaningful outcomes, and made a positive impact. The impact described in the following sections are partly based on interviews with PIs of WASP-HS projects, and partly on the instrument outcomes.

Scientific Impact and Career Development

WASP-HS research has attracted academic recognition, including Best Paper Awards and invitations to give presentations at prestigious conferences. Such recognition illuminates the quality and impact of WASP-HS research, further establishing the program's reputation as leading in the societal and humane perspectives on AI and autonomous systems.
WASP-HS as a research platform has provided valuable opportunities for career development and growth for the researchers involved. Younger as well as more senior researchers have expanded their knowledge, extended their research network nationally and internationally, developed skills, and positioned themselves as experts on AI related to their respective domains. This career development aspect has been profound within and across the projects' research environments and has been taken as the fundamental goal for the Research Leadership Program. One of the most referenced success factors by the Principal Investigators was the possibility to initiate novel directions for cross-disciplinary research, which has led to cutting-edge research directions, Swedish Research Council (VR) applications and other calls with topics in the humanities and social sciences. WASP-HS enables exploration and nurturing of collaborations, where some novel results feed into the humanities and social sciences topics becoming better positioned to receive VR grants.

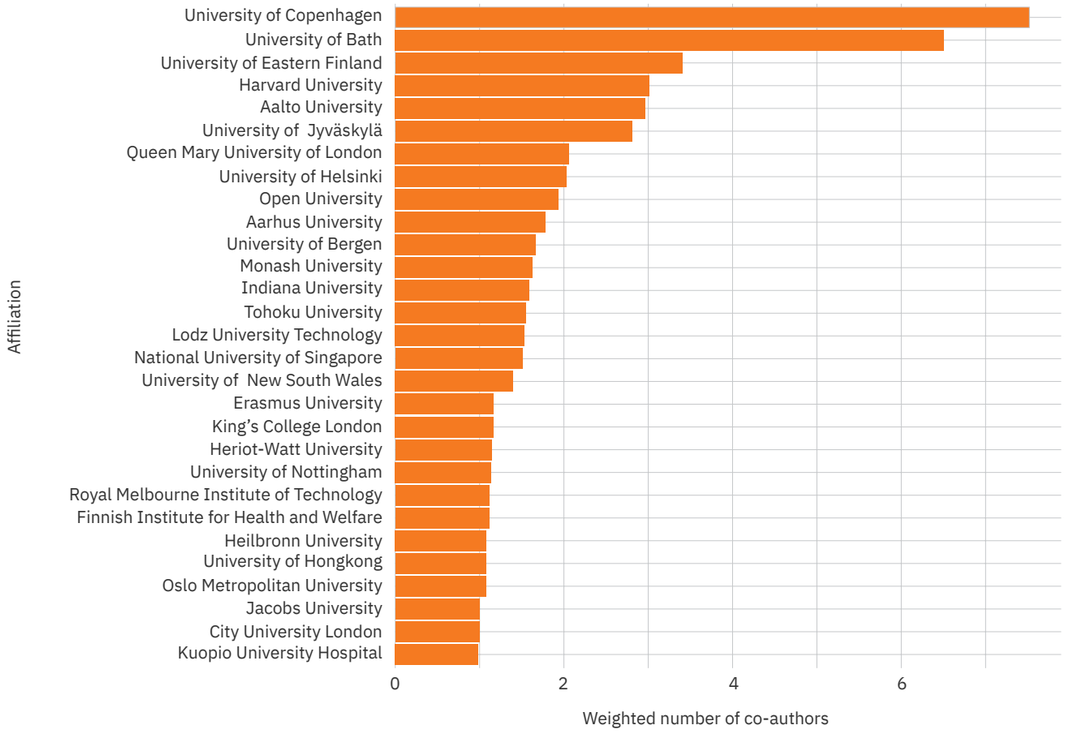
Interdisciplinary Collaborations

The main insight emerging from all projects is the critical importance of interdisciplinary collaboration and ethical considerations in the development and deployment of AI technologies. The research results emphasize the need for responsible and inclusive approaches to AI development, considering its implications on individuals, society, and various domains of human activity.

The program fosters interdisciplinary collaborations, bringing together experts from fields across the social sciences, humanities, medicine, science and technology to tackle complex challenges. This cross-pollination of ideas and expertise has led to innovative approaches and enriched perspectives, ultimately enhancing the quality and scope of research outcomes. The strength of the program is the local and national meeting places where new challenges and novel ideas have been given space to be explored. This has led to an increased holistic understanding of the societal implications of AI and autonomous systems, and, besides research results, led to successful grant applications to e.g., VR, to further deepen the research initiated within WASP-HS.

Societal Impact

WASP-HS's research has been communicated in public venues to the broader audience, and researchers have contributed to the societal exploration and dialogue on the futures and possibilities of AI and autonomous systems. The outcomes of the program have direct implications for society, contributing to discussions on ethics, fairness, trust, and the social consequences of emerging technologies. By critically examining dominant discourses and practices, research aims to promote greater transparency, accountability, and inclusivity in various domains. The insights gained from the program have the potential to positively impact individuals, communities, and institutions.



Stakeholder Engagement

WASP-HS emphasizes stakeholder engagement by involving various actors such as industry representatives, policymakers, healthcare professionals, and artists. This engagement has facilitated knowledge exchange, promoted dialogue, and ensured the relevance and applicability of research findings to real-world contexts and the identification of societally relevant challenges yet to be addressed.

Industry Impact

WASP-HS researchers have made an impact beyond academia, influencing industry and media conversations, and shaping best practices. By addressing key issues such as ethics, trust, inclusivity and the human perspective, research has informed the development and implementation of AI technologies, autonomous systems and robotics in application domains spanning healthcare, the financial markets, the cultural and creative industry, public authorities, and education. Insights have the potential to guide industry stakeholders, policymakers, and organizations towards more responsible, equitable, and innovative approaches.

International Impact

The WASP-HS program is present in international venues, and is increasingly known among leading research scholars and institutes. WASP-HS researchers have contributed to the European and global discussions on the effects of AI on society and humanity. As an example, WASP-HS contributed on May 25, 2023 to a meeting in Brussels on a shared European research agenda for AI at EU level.

Main Insights

WASP-HS research results and contributions include scientific publications, academic recognition, interdisciplinary collaboration and development of research networks, career development opportunities, industry impact, and societal benefits. These outcomes collectively highlight the program's commitment to excellence, capacity building, innovation, and the integration of AI and autonomous systems in society that facilitates the development of society in a sustainable direction. WASP-HS has taken a leading position in research and development of the futures of a society embedding AI and autonomous systems.

All the previously mentioned aspects of the impact that WASP-HS has indicate that the ultimate aim of the program is not only to create knowledge, build capacity, and to address challenging research problems from humane and social perspectives in a new research field, but to have an international societal and theoretical impact that makes WASP-HS one of the world-leading programs on the impact and consequences of AI and autonomous systems on humanity and society.

Outreach and Communication

WASP-HS aims to strengthen the link to the societal context in which the program operates. To do so, the program supports three main areas of activities: dialogues with stakeholders, collaborative research calls, and communication.

Dialogues with Stakeholders

The program stays in touch with politicians, public and private organisations, and industry. This network of stakeholders is also invited to the annual conference AI for Humanity and Society.

The most established program model for having structured and regular dialogues with stakeholders is the Community Reference Meetings (CRMs).

AI for Humanity and Society – annual conference

AI for Humanity and Society is an annual conference arranged by WASP-HS and serves as a meeting place for dialogue on the opportunities and challenges of artificial intelligence and autonomous systems with a strong focus on research in humanities and social sciences. The main theme of the conference is different each year. So far, four conferences have taken place and on every occasion between 200 and 300 people from academia and the private and public sector have participated. The first AI for Humanity and Society conference took place in 2020, and was held online due to the Covid pandemic. The 2021 and 2022 conferences were organised in hybrid format. The themes of these two conferences were “Shaping a Future with AI – The Role of Policies” and “Dreams, Realities, and Futures: Risks and Consequences of AI in Formatives Times”. In 2023, the conference topic was “Living with AI – Critical Questions for the Social Sciences and Humanities“. In conjunction with the 2023 conference, seven workshops, hosted at Malmö University, on various topics related to the conference theme, were organised with the intention to foster discussions and exchange ideas.

Abeba Birhane, Senior Fellow in Trustworthy AI at Mozilla Foundation, keynote speaker at the annual WASP-HS conference AI for Humanity and Society 2022.

Community Reference Meetings

WASP-HS Community Reference Meetings (CRMs) are meeting places for private and public organisations and WASP-HS researchers. Each meeting has a specially selected theme with the aim of bringing business and research together to expand knowledge and strengthen collaboration.

Typically, two to three Community Reference Meetings are arranged each year, and so far, eight have taken place in total.

After each Community Reference Meeting a report is published on the WASP-HS website based on the discussions held, including suggestions for future steps on the topics. The reports are written by the WASP-HS Program Director together with the WASP-HS researchers leading the discussions of each event. One of the panel discussions hosted during the Community Reference Meeting Media and AI resulted in an article in the journal Leonardo in 2023.

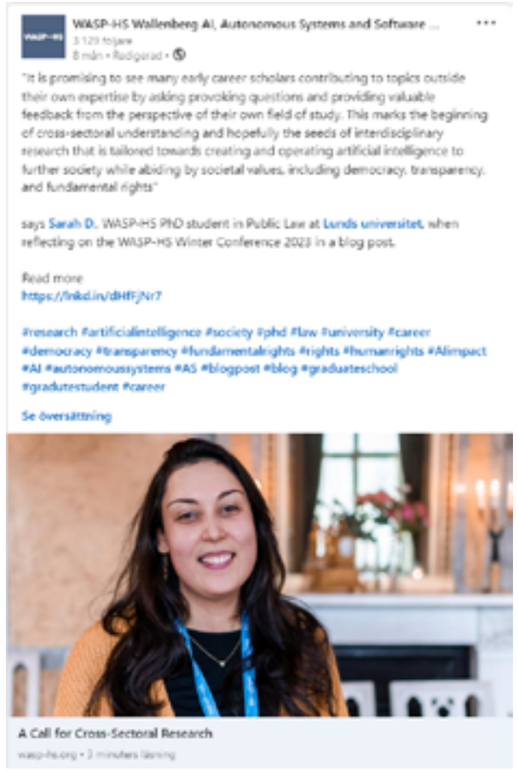
List of Community Reference Meetings

2021	• AI and Healthcare • Life in the Digital World • FinTech
2022	• AI, Sustainability and Smart Cities • Challenges and Opportunities of Regulating AI • Media and AI
2023	• AI, Education and Children • AI, Sustainability and Agenda 2030

Communication

Information about the program, including news, open calls and positions, upcoming events and more is communicated through various channels. External communication is intended for external researchers, the Swedish business sector, politicians and journalists. The channels used for external communication are: the WASP-HS website at which news and blog posts written by the WASP-HS community are published, monthly newsletters, and social media platforms X (Twitter) and LinkedIn. Press releases and direct contact with target groups is another means of external communication. A new website design is in progress and was launched during 2023. On the website, blog posts written by people in the WASP-HS network about research and events are published approximately twice a month. The website also features information about the researchers themselves and their research projects, and news and events that are being organised are published regularly.

To reach the close to 300 WASP-HS researchers and PhD students within the program, an internal newsletter is distributed once every month. To further strengthen communication with, and between, the WASP-HS researchers an improved internal website is being developed, which will facilitate more interaction among the researchers.



LinkedIn post promoting PhD student Sarah de Heer's blog post about the WASP-HS Winter Conference 2023.

Start page of the new WASP-HS website, www.wasp-hs.org, launched in autumn 2023.

Governance Structure

The organization of WASP-HS consists of the Board of Directors, the Management Team, the International Scientific Advisory Board, the Scientific Evaluation Committee, and the Program Office. As a bridge between all sections of the WASP-HS governance structure is the Program Director who is responsible for overseeing the successful planning and execution of the program.

Board of Directors

The Board of Directors is ultimately responsible for the program and its strategic direction under the guidance of the Chair of the Board. The main task of the Board is to be responsible for the strategic direction and overall planning of the research program as well as for distribution and coordination between the program's instruments, so that WASP-HS is given maximum opportunity to achieve its objectives. The WASP-HS Board of Directors consists of members with expertise in research and practice in social sciences, humanities, and technology, and who have experience with large multidisciplinary research programs.

Program Director

The Program Director is responsible for overseeing the successful planning and execution of the program, with support from the Management Team for planning and strategic decisions, and with support from the Program Office for program coordination and administration. The Program Director is an internationally renowned researcher on multidisciplinary aspects of AI, and has experience with large multidisciplinary research programs.

Management Team

The WASP-HS Management Team supports the Program Director in the strategic operational management of the program. The members of the Management Team have complementary expertise in the areas of humanities, social sciences, and technology, and are internationally renowned researchers on multidisciplinary aspects of AI. They are located professionally at universities across Sweden.

International Scientific Advisory Board

The International Scientific Advisory Board (ISAB) gives advice to and evaluates the program from an international point of view. The International Scientific Advisory Board consists of top international scholars in complementary areas closely related to the program. Each year the International Scientific Advisory Board meets to discuss the program and provide yearly follow-up reports to the program's Board of Directors and the Wallenberg Foundations.

Scientific Evaluation Committee

The evaluation and selection of submissions to WASP-HS calls are based on the fundamental principle of peer-review and are carried out by an independent Scientific Evaluation Committee (SEC). The committee consists of leading researchers from Nordic countries, with a composition based on the principles of balancing discipline, gender and country.

Program Office

The WASP-HS Program Office provides the Program Director with administrative support. The Program Office is appointed by, and led by, the Program Director. The Program Office includes a Program Coordinator who supports the Program Director in the operational management and coordination of the program. The WASP-HS research program is hosted by Umeå University and the administration of the program is delegated to the Department of Computing Science. The Program Office consists of seven members who have specific expertise within finance, communication, administration, project coordination, and coordination of the program.

WASP-HS in Numbers

WASP-HS has researchers working at universities and research institutes across Sweden. Their combined network stretches not only all over the country but also out across the globe. The research projects they are working on include researchers from multiple and multidisciplinary backgrounds, as well as from different universities.

The WASP-HS Graduate School has three cohorts, which started in autumn 2020, winter 2022 and autumn 2023 respectively. All cohorts include both PhD students funded by WASP-HS and affiliated students.

WASP-HS has an active presence on social media, posting about events, news and blog posts from PhD students and researchers, as well as a newly redesigned website, with thousands of visitors every month.

CHALMERS

Institute for Futures Studies

KTH Royal Institute of Technology

LINKÖPING UNIVERSITY

Linnaeus University

LUND UNIVERSITY

MALMÖ UNIVERSITY

SLU

Stockholm University

UMEÅ UNIVERSITY

UNIVERSITY OF GOTHENBURG

UPPSALA UNIVERSITY

ÖREBRO UNIVERSITY

14

Universities

1

Research Institute

Researchers and Research Projects

54

Research Projects

28 MAW/MMW funded

26 WASP-HS funded

18

Career Positions

11 WASP-HS funded Assistant Professors

6 Guest Professors

9

Collaborative Research Projects

2 Innovative Collaboration Project

1 PhD in Society Project

6 NetX*

8

Cross-Project Collaborations

23 Researchers from

21 Research projects

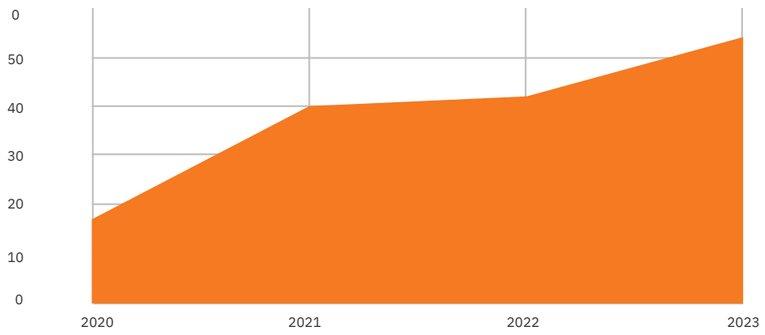
11

Affiliated Projects

Including **1** affiliated assistant professor

Plus **6** ukrainian researchers

Number of projects over time



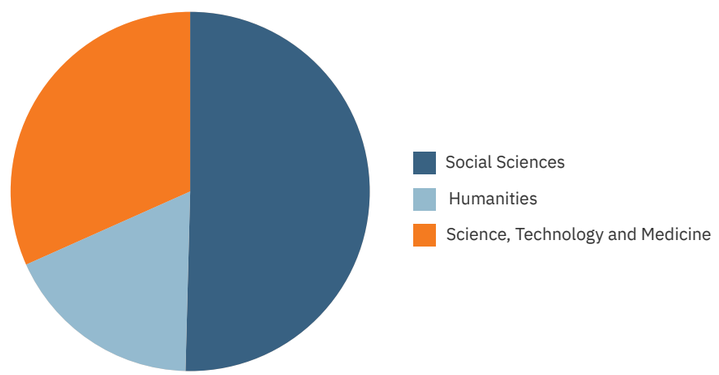
*Networking Excellence Projects in the Humanities and Social Sciences for the Study of Consequences and Challenges of Artificial Intelligence and Autonomous Systems

111

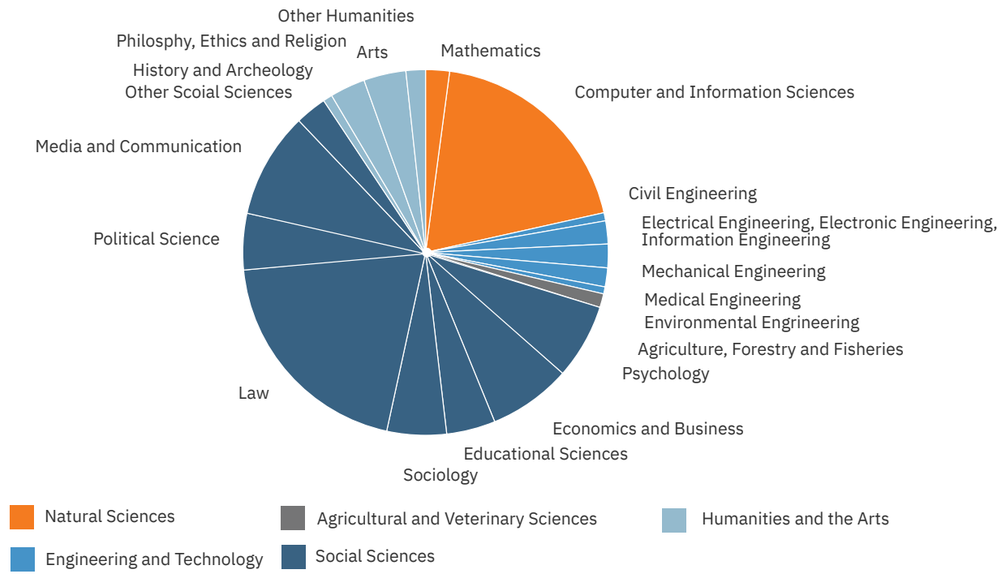
PIs and Co-PIs

11 Topic Leaaders

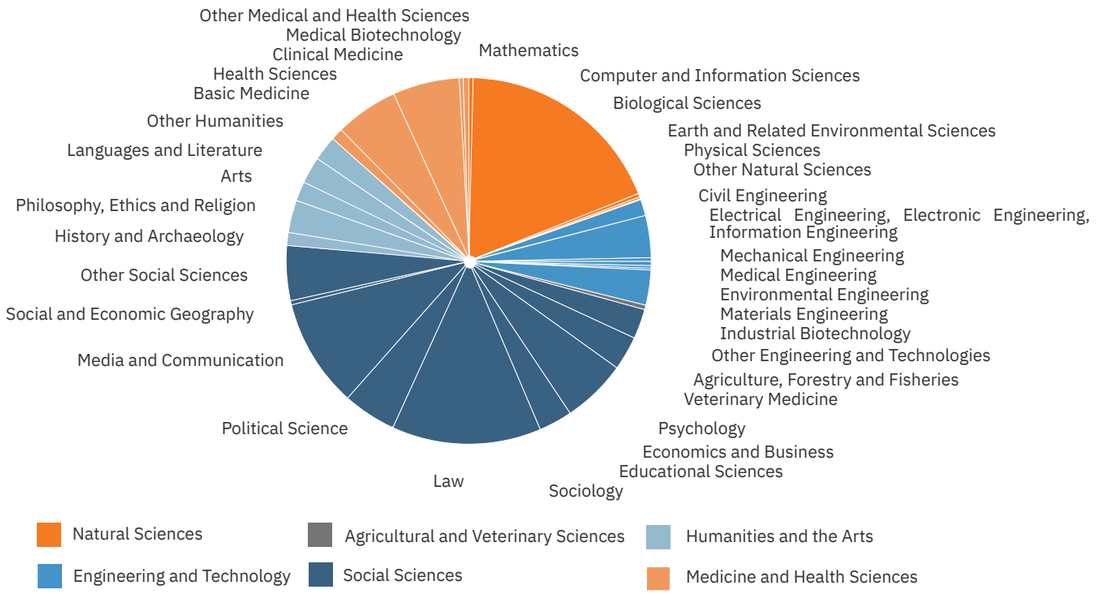
Research fields of PIs and co-PIs



Distribution of project members academic backgorund (PhD research field)



Publications by research fields (SCB categories)



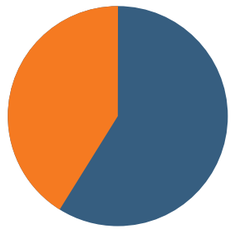
PhD Students

93

PhD Students

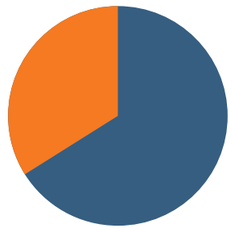
34

PhD students in cohort 1



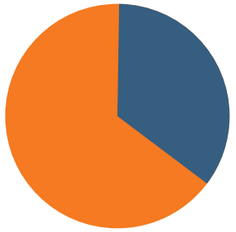
41

PhD students in cohort 2



18

PhD students in cohort 3



WASP-HS funded Affiliated

5

Accepted semester abroad applications*

*PhD students have been able to apply for semester abroad since summer 2022

Communication Channels

918

Subscribers of the WASP-HS external newsletter

3229

Subscribers on LinkedIn

* LinkedIn subsrcriber count 14 December 2023

1511

Subscribers on X

* X subsrcriber count 14 December 2023

Website

28 160

average number of visits per month

5 285

average number of visitors per month

Appendix 1: Program History

The Wallenberg AI, Autonomous Systems and Software Program – Humanities and Society (WASP-HS) is a research program funded by the Wallenberg foundations to address the societal and human impact of AI and autonomous systems. The program was formally approved by the board of the Marianne and Marcus Wallenberg Foundation (MMW) on 15 March 2019 and is expected to run from 2019 to 2028 with a planned total budget of 660 MSEK. Furthermore, a number of projects funded by the Wallenberg foundations are part of the program. WASP-HS forms an independent and parallel program to, and maintains a close dialogue with, the Wallenberg AI, Autonomous Systems and Software Program (WASP), in which the Wallenberg foundations have made significant investments in technological research funded by the Knut and Alice Wallenberg Foundation (KAW). The starting point for WASP-HS was a call for grants, related to the consequences of autonomous systems and AI, issued by MMW in spring 2019. The wide range of themes listed in the call signalled a broad approach that addressed most disciplines in the humanities and social sciences. Current developments in AI have the potential to affect our lives and our world in ways that no other technology has done before. From healthcare to manufacturing, from finance to entertainment, AI has the capacity to improve efficiency, decision accuracy, and profits, as well as solve many of the complex problems the world is facing today. However, alongside this message of positive expectations, awareness is rising about the potential risks and negative consequences of AI for people and the planet. From a lack of transparency associated with the methods that underlie decision accuracy, to the propagation of bias and discrimination deriving from data to the high-energy consumption of computation and data servers, the challenges of AI development and use reach many aspects of society and environment. Governments, businesses, and the public in general are increasingly asking questions about the development and use of AI. Thus, the use and development of AI should consider its human, ethical, legal, economical, organisational, and cultural context. Research and insights are therefore needed from a broad range of disciplines in the humanities and social sciences. Most issues demand interdisciplinary approaches. Research in these areas spans the whole spectrum from basic to applied research, therefore interactions with stakeholders and actors outside the academia are of key importance to pursue WASP-HS goals.

Appendix 2: References

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