

Industrial PhD Student and Industrial Postdoc Calls

Webinar 2025-05-27

Program

- **10:00 Introduction** Karl-Erik Årzén, WASP Co-director - Lund University
- 10:15 General presentation about WASP Industrial PhD Student program Karl-Erik Årzén, WASP Co-director - Lund University
- 10:40 General presentation about WASP Industrial postdoc program Karl-Erik Årzén, WASP Co-director - Lund University
- 10:50 WASP Graduate School Daniel Axehill, WASP Graduate School Director – Linköping University
- 11:10 Perspectives from industry Mikael Norrlöf, industrial PhD student supervisor at ABB Robotics + Bernhard Wullt, industrial PhD student
- 11:40 Questions and discussion



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WALLENBERG AI, AUTONOMOUS SYSTEMS AND SOFTWARE PROGRAM











AFFILIATED GROUPS OF EXCELLENCE AT







Knut and Alice Wallenberg Foundation

Vision

Excellent research and competence in artificial intelligence, autonomous systems and software for the benefit of Swedish society and industry.

Mission

Build a world leading platform for academic research that interacts with leading companies and actors in Sweden to develop knowledge and competence for the future.



WASP in Numbers





2024 WASP Top Research Challenges

- Complex data and models in AI
- Human in the loop and explainability
- Scaling and distribution of resources
- Efficiency, verifiability, security and robustness





WASP Instruments

- Research program
- Graduate school
- > Recruitment
- Research arenas
- > Internationalization
- Communication events networking



WASP Status 2025

74 International Recruitments

500 Active PhDs (187 have defended)

80 affiliated companies and agencies engaged



WASP Winter Conference 2024 with 550 participants



One PhD per week!





Strategic Initiatives and Collaborations 2025







Cybersecurity Initiative

Wallenberg Initiative Materials Science for Sustainability (WISE) Data Driven Life Science (DDLS)



WARA - Research Arenas

Four Operational Arenas

- Public Safety
- Media and Language
- Robotics
- Operations



Internationalization

The WASP program is situated in an internationally fast-moving area and the international dimension is inherent in the program.

- Collaborations with
 - Stanford
 - Aalto
 - Berkley
 - MIT
 - NTU
 - Caltech
 - ETH
 - ...
- Annual study trips
- Semester abroad
- Postdocs





Berzelius - AI Resource

- ATOS NVIDIA SuperPod
- 94 DGX A100 systems
- 8 A100 GPUs/node
- 5 PetaFLOPS/node
- 1800 Gb/s interconnect
- Hosted by the National Supercomputer Centre (NSC) and integrated in the HPC environment for compute and storage solution
- Fully utilized as of April 2022
 - Natural Language Processing (GPT-SW3)
 - Protein Folding
 - Computer Vision

Atos Berzelius

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Industrial PhD Student Call



Swedish PhD Education

- Four years at 100% level
- Normally done at 80% level and takes five years
 - University PhD students do 20% teaching
 - Industry PhD students work 20% at the company doing non-research related tasks
- Four years correspond to 240 high school credits (hp)
- All PhD students are required to take 60-120 hp courses
 - Varies depending on department
 - Normally 90 hp (corresponds to 1.5 year full time studies)
 - Normally the departments require that certain mandatory courses are included
 - The WASP mandatory courses are 27 hp, i.e., most courses are not WASP courses
- The rest constitutes the research and the PhD thesis



WASP Industrial PhD Students

- Employed by a company
- PhD studies at a university department of a WASP university
- Four years if 100% research
- Five years if 80% research (20% for other non-research related tasks at the company) the normal case
- The company receives 600k SEK / year from WASP (100%) or 480k (80%)
 - Includes a travel budget of 30k / year
 - The PhD student should be allowed to travel also if the company has a travel ban
- The academic advisor gets funding from WASP corresponding to 15% for the academic supervision



- The PhD student has an university PhD advisor and an industrial PhD advisor (ideally a person with some research experience)
- The PhD student must spend at least 20% of the time physically at the university and at least 20% at the company
 - However, in practice, spending only 20% at the university is not enough
- A contract is signed between the company and the university
- No contract between the company and WASP
- There should be an individual development plan ("utvecklingsplan") for the PhD student at the company that treats, e.g., main contact person, industrial supervisor, the role of the closest manager, the role of the project in the overall company strategy
- At the university there will be an individual study plan (ISP) for the PhD student that details issues such as time spent, research results obtained etc



Companies Involved

- >100 active industrial PhD students from around 80 companies
 - 33 industrial PhDs produced
- Companies with large involvement
 - Ericsson
 - Saab
 - Zenseact
 - ABB
 - Astra Zeneca
- Most industries have only one PhD student each
- Research institutes, e.g., RISE, and public organizations may not participate
- Not only the traditional system industry but also, e.g., finance, media, consulting, health,



This Call

- Up to 15 projects (Note, projects and not positions)
- Call opens: 9 June, 2025
- Application deadline: 1 October, 2025, 14:00
- Decision by the WASP Board communicated: 27 November
- Earliest start date: 1 January 2026
- Latest start date: 15 June 2026



Applications

- Submitted through the WASP application portal
 - <u>https://wasp-sweden.org/opportunities/calls/</u>
 - Use the application form available there
- Should be signed by both the academic and the industry supervisor



Two-Student Projects

- You can either apply for a one-PhD student project or for a two-PhD student project
- You may only apply for a two-PhD student project if at least one of the two candidates is of the underrepresented gender (on the WASP level)
- A two PhD student project should clearly describe the role of each of the students in the project and how they complement each other
- A two-PhD student project is either accepted fully or rejected fully, i.e., it cannot happen that only one of the two candidates is accepted
 - You must really think through if you should apply for a one- or a two-student project
- Each industrial supervisor may submit at most one application



WASP Research Areas

- Autonomous Systems (AS)
 - Research on autonomy, including enabling technologies for autonomous systems
 - Transport systems, self-driving vehicles, perception, interaction, visualization, human-machine collaboration, multi-agent systems, robotics, autonomous clouds and networks, security, localization, optimization,
 - Strong systems focus
 - Data-driven and/or model-based approaches ("WASP is not only AI")
- Artificial Intelligence (AI)
 - MLX
 - Machine Learning, Deep Learning, and Next Generation/Explainable Learning
 - MATH
 - Mathematical Foundations of AI/ML
 - Theoretical Computer Science foundations of AI



WASP Research Areas

- Software (SW)
 - Software methodology and software technology.
 - Software for the modelling, analysis, development, training, verification, and deployment of autonomous or AI and ML-based systems.
 - Software that contains or utilizes autonomy, automation, AI, learning, or feedback.
- Cyber-Security (CS)
 - Of relevance to AS, AI and SW



What the Autonomous Systems and Software students actually do





What the AI students actually do





Evaluation Criteria

- Three aspects of the proposal are evaluated
 - Project
 - Scientific excellence
 - Uniqueness, visionary and novelty nature
 - Relevance to WASP
 - Potential to collaborate with other WASP initiatives such as WARA
 - PhD student candidate(s)
 - Grades from Master Education
 - Supervisors
 - Scientific merits
 - International research experience
 - Pedagogical skills and merits
 - Ability and experience to collaborate with academia and industry
 - Doctoral student and supervisor constellations with underrepresented gender and/or junior researchers are encouraged



- The industrial PhD student instrument is primarily aimed at students who already are employed at the company
- Some, e.g., small, companies may have no internal candidate. In that case it is also possible to employ a student candidate especially for this position.
- The candidate must be identified at application time, but need not be employed before the latest start date
- In the latter case there is a risk that the student disappears after the proposal has been accepted but before the latest start date
- In that case the company is allowed to propose a new candidate if that candidate has at least as good qualifications as the original one
- If the student decides to quit after the start, then the project will be terminated



Elements of a Good Proposal

- Fits into the WASP research program
- Clear and well-described scientific problem / research questions
- Novelty
- Explain why the applicants are the best parties to address this problem how they complement each other
- Added value to academia, industry, and Sweden
- And above all
 - Strong PhD student candidate(s)



Further Information and Questions

General Questions: info@wasp-sweden.org

Further Information and Guidance from the WASP University Representative Group:

- CTH Robert Feldt robert.feldt@chalmers.se
- KTH Bo Wahlberg bo@kth.se
- LU Karl-Erik Årzén karl-erik.arzen@control.lth.se
- LiU Michael Felsberg michael.felsberg@liu.se
- LTU Marcus Liwicki marcus.liwicki@ltu.se
- UmU Erik Elmroth erik.elmroth@umu.se
- UU Thomas Schön thomas.schon@it.uu.se
- ÖrU Franziska Klügl franziska.klugl@oru.se



- How should the project topic be defined?
 - Sufficiently long-term so that the results still are of value to the company after five years
 - Sufficient research depth for publications
- How handle deviations?
 - Very few PhD students end up with a thesis that is exactly about the problem that was initially formulated
 - Deviations occur due to several reasons
- What is a good PhD student candidate?
 - An ideal PhD student candidate should have a couple of years of experience of the company but still have the graduate education fresh in mind
 - However, WASP accepts industry PhD students also if they have shorter or longer experience
 - Good analytic competence, excel at problem solving, good oral and written communication skills
 - Good grades, in particular in the courses of relevance
 - Have in mind that many of the WASP courses are rather mathematical in nature



- What is the objective for the company?
 - Initiate a long-term collaboration with a leading research group in order to improve the company's innovation capacity
 - Solve a challenging problem
 - Increase the knowledge within an area that is of relevance to the company
 - Competence buildup for a promising employee
 - Obtain persons with sufficient skills to take a leading R&D role after 5 years

•



- The company must be aware of the realities of PhD studies
 - Around 1.5 years full time are spent on taking courses
 - Some of the courses may be of less interest to the company (and the student) but they must still be taken
 - An important part of the studies consists of travels to conference, summer schools, study trips, meetings of different kind, in order to discuss, present, and learn
 - The PhD student must have the possibility to travel also if the company has a travel ban



- How should one guarantee that the PhD student remains to be relevant to the company during these five year?
 - Involved in a research-related "shadow" project where intermediate research results can be evaluated and which can generate new research questions
 - Formalize the knowledge transfer using, e.g., regular presentations by the PhD student at the company


Some Questions and Issues

- How can we be sure that the PhD stays with the company afterwards?
 Well,
- How do we start?
 - Start by identifying the PhD student candidate and the academic supervisor
 - If you do not have contacts in academia yourself then ask the WASP university representatives
 - Start the project discussions with the academic supervisor as early as possible
 - He/she knows best which research problems that fit into WASP and which don't
- More information about industrial PhD studies in WASP can be found at

https://wasp-sweden.org/wp-content/uploads/2019/12/IndustrialPhD_Final_print.pdf



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Industrial Postdoc Call



Industrial Postdocs

- Targeting newly graduated PhDs who have not decided on career path.
- Enables hosting company to "get to know" the postdoc and at the same time conduct a two-year academic project.
- The hosting company applies together with a university research group. There should be identified mentors at both the company and the university.
- Industrial relevance and academic quality are key priorities.
- The postdoc will be employed by the company, but the time should be shared between the company and the university (nominally 50-50)
 - At least 50% of the time at the university
 - At least 20% of the time at the company





Industrial Postdocs

- Although the main target is newly graduated PhDs also candidates with an older PhD exam may apply
 - The PhD does not have to be performed in WASP
- The projects are expected to address fundamental research problems with industrial relevance within any of WASPs research areas
- Total grant over two year: 2.2 Mkr out of which 300k goes to the university and 1.9 Mkr to the company for partial salary funding
 - For SMEs the total grant is 2.7 Mkr, and 2.4 Mkr goes to the company
 - Up to five positions





Rules

1. For the project:

- a. At least 80% of full time
- b. At least 50% of the time at the university
- c. The research should be at the level that it can be published in a scientific journal or conference. This holds for the entire project, i.e., also th part that is performed at the company. Patent applications are not considered as scientific publications.

2. For the company:

- a. The company should be sufficiently large to be a suitable host for the industrial postdoc, i.e., at least two-three full-time employees
- b. There should be an academically competent supervisor/mentor at the company working with research or research related tasks



Rules

3. For the industrial supervisor/mentor:

- a. Should have sufficient academic competence
- b. Cannot be the same person as the university supervisor/mentor
- c. The industrial supervisor/mentor should not have been the postdoc candidate's supervisor during his/her PhD

4. For the university supervisor/mentor:

- a. Can be involved in the company but not as the CEO
- b. Can own parts of the company but not be the main owner

5. For the industrial postdoc:

- a. Can be involved in the company but not as the CEO
- b. Can own parts of the company but not be the main owner

In general be careful if there are personal or business relationships between the applicants and the candidate. We might have missed some cases above. Contact us before you start writing.



Evaluation Criteria

- The academic qualifications of the industrial postdoc candidate. (must be a PhD)
- The industrial relevance of the project.
- The scientific level of the project.
- The industrial and academic qualifications of the industrial and the academic supervisors as well as their potential to support the candidate and the project.
- Mobility, i.e., to what extent the candidate has changed research group between the most recent university appointment and the planned industrial postdoc.

For work permit and residence reasons it may be necessary for applicant to submit the application prior to obtaining the PhD. In such cases, a statement from the PhD advisor regarding planned date for defense should be provided.



More information

- CTH Robert Feldt robert.feldt@chalmers.se
- KTH Bo Wahlberg bo@kth.se
- LU Karl-Erik Årzén karl-erik.arzen@control.lth.se
- LiU Michael Felsberg michael.felsberg@liu.se
- LTU Marcus Liwicki marcus.liwicki@ltu.se
- UmU Erik Elmroth erik.elmroth@umu.se
- UU Thomas Schön thomas.schon@it.uu.se
- ÖrU Franziska Klügl franziska.klugl@oru.se



Timeline

- 2025-06-09 Call opens
- 2025-10-01 Application deadline 14:00
- 2025-11-27 Decision communicated
- 2026-01-01 Earliest Start date
- 2026-08-31 Latest Start date



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WASP Graduate School WASP Webinar 2025-05-27

Daniel Axehill, Linköping University Director WASP Graduate School

The Graduate School Mission

The mission of the WASP Graduate School is to educate PhDs with skills in **strategically important disciplines** within WASP, together with a **broad knowledge** of **AI**, **autonomous systems and software development**.



WASP Graduate School Statistics

WASP Graduate School May 2025

- 493 active PhDs students
- Including about 100 industrial PhD students
- 186 have defended so far

Targets for 2031

- 600 PhDs who have defended
- Of which 150 industrial PhDs





Goals for Students



Students should become knowledgeable researchers in the area of AI, autonomous system or software.



Students should form a strong sense of **belonging** to WASP connecting them together.



Students should get to know Swedish **industry**.



Students should form a strong and valuable international academic-industrial network.



Students should strive for excellence.



Goals for Graduate School



We will organize courses and activities to provide the students with state-ofthe-art knowledge in AI, autonomous systems and software.



We will organize **courses** and **activities** that **respect** the needs of a **heterogeneous** group of students spread out over Sweden.



We will provide added value to the students' PhD education.



We will provide **opportunities** to those that really want to **excel**.



WASP Graduate School Activities: General Offer



WASP Graduate School: Courses

Introductory courses (voluntary) cannot be included in the required 27hp	 Introduction to logics for AI (2hp) Introduction to Mathematics for Machine Learning (4hp)
Mandatory course	 Ethical, Legal and Societal aspects of AI and Autonomous Systems (3hp)
Foundational courses (2 out of 4 required, select at most one out of AI & ML and Math for ML)	 Autonomous Systems (6hp) Al and Machine Learning (6hp) Mathematics for Machine Learning (6hp) Software Engineering and Cloud Computing (6hp)
Advanced courses: At least 2 more courses required (also any remaining foundational course can be selected)	 Advanced Autonomous Systems (6hp) Deep Learning (6hp) Deep Learning for NLP (6hp) Graphical Models, Bayesian Learning and SRL (6hp) Interaction, Collaboration, and Visualization (6hp) High Dimensional Statistics and Optimization (6hp) Learning Feature Representations (6hp) Learning Theory (6hp) Planning and Relational Learning (6hp) Reinforcement Learning (6hp) Scalable Data Science (6hp) Topological Data Analysis (6hp)
	 WASP Project Course (6hp)

Course Schedule

Yearly courses (introductory, mandatory, foundational)

Autumn

Autumn

Autumn

- Introduction to Mathematics for Machine Learning (4hp)
- Introduction to logic for AI (2hp)
- Artificial Intelligence and Machine Learning (6hp)
- Software Engineering and Cloud Computing (6hp)
- Ethical, Legal and Societal aspects of AI and Autonomous Systems (3hp)

- Autonomous Systems (6hp)
- Mathematics for Machine Learning (6hp)

Courses given odd years only (advanced)

Deep Learning (6hp)

Spring

Spring

Spring

Interaction, Collaboration and Visualization (6hp)

- WASP Project Course (6hp)
- Topological Data Analysis (6hp)
- Graphical Models and Bayesian Learning (6hp)
- Advanced Autonomous Systems (6hp)

Courses given even years only (advanced)

- Learning Theory (6hp)
- Deep Learning for Natural Language Processing (6hp)
- Planning and Relational Learning (6hp)

- Reinforcement Learning (6hp)
- Learning Feature Representations (6hp)
- Scalable Data Science and Distributed Machine Learning (6hp)
- High-dimensional statistics and optimization (6hp)

WASP Graduate School Activity Requirements

- Mandatory activities
 - Collect 27 ECTS credits of WASP Graduate School courses
 - 3+12 ECTS mandatory and foundational courses (with some freedom of choice)
 - 12 ECTS advanced and/or foundational courses (with full freedom of choice)
 - Attendance at the annual Winter conference
 - Attendance at the Community Building Summer School the first year (depending on starting date)
- Expected attendance
 - The two centrally arranged study trips (years 1-2)
 - The thematic summer school Year 2



Take the opportunity that **WASP** is and strive to do the most of it!



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WASP Industrial PhD student and industrial Postdoc Calls 2025 – Industrial Perspective



Mikael Norrlöf, PhD Motion Control Tech Owner, ABB Robotics



Bernhard Wullt Industrial PhD student, ABB Robotics



years history

ABB in numbers Company facts

105,000+ Employee globally

Nationalities

173

\$34 bn Order intake \$32 bn Revenues

16.9%

Operational EBITA margin

177

Manufacturing sites globally \$1.3 bn

R&D investment

26,000+

Number of patents filed 21%

Women in senior management positions

76%

Reduction of scope 1 and 2 GHG emissions since 2019

Our Business Areas

ABB ABB **Robotics & Discrete** Electrification Motion **Process Automation** Automation

Our priorities



TOP 5 GLOBAL ROBOTICS TRENDS







Find out more at: https://ifr.org/ifr-press-releases/top-5-global-robotics-trends-2025

Source: International Federation of Robotics

Some take-aways



My short-list:

- 1. Find the right student
- 2. Work out the best fit for hosting group and supervisor(s)
- 3. Make sure the work is inline with the long-term roadmap
- 4. Do not expect to get products as output
- 5. Make sure your organization is prepared to handle the financial support for the complete project (4-5 years)
- 6. WASP is a platform for collaboration and networking not only for the PhD student **use it!**

Good luck with the applications!



INDUSTRIAL PHD EXPERIENCE

Bernhard Wullt

ENGINEERED TO OUTRUN

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2017 Master in Mechanical Engineering

• Luleå Technology University (LTU)

2017 – 2021 ABB robotics, Västerås

- Mechanical design
- Predictive maintenance
- Software development

2021 – (2026) WASP Industrial PhD

- Uppsala University
- Topic: Motion planning for robot arms



Why a PhD

Why did I chose to do a PhD?

- At the time very interested in AI
- Wanted to be part of the development
- Wanted a deeper understanding of the methods

Why did I chose the industrial PhD track?

- Wanted a good mix of practical application and theory
- Was happy to continue to work for the company
- Felt like a natural next step in moving towards an expert role at my work place

Practical setup and experience

PhD setup:

- 80/20 split between research and work
- Moved to Uppsala after the first year
- Work at Uppsala University
- Easier when it comes to courses, participating in seminars etc.

Industrial PhD role:

- My topic is grounded in industrial need
- But it is exploratory, I have a lot a individual freedom
- You have to be ready work independently

Benefits of being part of WASP

WASP graduate school:

- Offers good courses within AI
- Many participants from different Universitys

Winter conference:

- Annual conference
- Easy to make new contacts
- All WASP student meet and present their work

WARA Robotics arena:

- Great platform for experiments
- Great service, listen to your needs and helps you to get started

Benefits of being part of WASP

Reasearch study trip:

- Boston 2023
- Visiting MIT, Boston dynamics etc.

Self-arranged study trip:

- South-korea 2024
- WASP students from different universities
- Organized our own schedule

Research stay at external university

- Recieved funding to visit ETH in Zurich for 3 months
- Great collaberation opportunity
- Very inspiring to be in a top research group



Benefits of being part of WASP

WASP offers much more:

- Clusters
- Summer schools
- Diverse set of WARAs
- Unique project courses

Key message:

• WASP offers a unique possiblity to enlargen your network outside of your hosting university




