RELIANT
Industrial graduate school

Mälardalen University

RELIANT Industrial graduate school:
Reliable, Safe and Secure Intelligent Autonomous Systems

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The RELIANT industrial graduate school is funded by the industrial partners together with **Knowledge Foundation**

The industrial research school RELIANT

RELIANT targets reliable, safe and secure intelligent autonomous Cyber-Physical Systems (CPS) and aims to be instrumental in development and deployment of the latest research results regarding intelligent autonomous systems in Swedish industry. Our partners are found within vehicle solutions in transportation and construction, autonomous and intelligent systems, as well as electronics and software for autonomous systems. The results of RELIANT will support all business sectors where next generation products are assumed to have autonomous functionality with maintained or increased reliability, safety and security.

RELIANT aims to make significant advances in technology and methodology for development of intelligent autonomous high-performance CPS and use of such systems in modern industries. The results should be able to use COTS (Commercial-of-The-Shelf) components and development tools, making our results directly applicable to industry. RELIANT will target the conjunction of autonomy and reliability in combination with safety and security, with the goal to integrate all this into CPS. A key aspect of RELIANT is to address such problems through the collective experience facilitated by the virtual use-case concept.

RELIANT is an integral part of the strategic research area of Mälardalen University (MDU) affiliated with the School of Innovation, Design and Engineering (IDT) and comprising three complementary activities:

1 Research, organized in the form of PhD research projects in real industrial cotexts. The PhD students will work in close cooperation with senior researchers at MDU, industrial specialists, and international researchers and experts.

2 Networking activities, with the goal of establishing strong networks between PhD students, industrial specialists and managers, as well as with prominent international and national researchers.

3 Courses, seminars, and activities related to interdisciplinary competence, especially targeting engineering of the next generation of reliable, safe and secure intelligent autonomous CPS.

Content

Industrial doctoral students

Alexandre Justo Miro **TRATON Group**

Alexandre Justo Miro is an industrial doctoral student at Traton Group (former Scania) and Mälardalen University from 1st of September 2024. Before that he worked for 3 years as an engineer in autonomous driving at Scania, received a double master's degree in Autonomous Systems from KTH and University of Trento in 2021, and a bachelor's degree in Engineering Physics from the Polytechnic University of Catalonia - BarcelonaTech (UPC) in 2019. His research area is perception for heavy autonomous vehicles, with a focus on out-of-distribution scenarios, such as long range and bad weather conditions. In particular, he is exploring different data representations and deep learning architectures that can enable heavy autonomous vehicles to operate safely and reliably on public roads.
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Asrin Abdollahi **RISE Research Institutes of Sweden**

Asrin Abdollahi is an industrial Ph.D. student at Mälardalen University. Working as a researcher at the RISE Cybersecurity Unit, Research Institute of Sweden. With expertise in identifying and mitigating vulnerabilities in internet of things (IoT) within embedded systems. Her academic journey began with a focus on IoT and security, particularly in Intrusion Detection Systems (IDS), and now she is concentrating on RISC-V, which offers significant benefits for IoT applications. Her objective is to develop both hardware and software security solutions, including trusted execution environments (TEEs) and trusted platform modules (TPMs), tailored for low-power RISC-V IoT devices.
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Elias Kettunen **Cicor**

Elias Kettunen is an analog design engineer, embedded systems, at Cicor Nordic Engieering, with earlier studies in Electrical Engineering at Uppsala Universitet. As of 2024 through a joint venture with Mälardalens Universitet and Cicor he started his Industrial PhD at RELIANT, specializing in the application of AI and machine learning in embedded and edge systems. His research currently focuses on predictive maintenance and deploying machine learning models directly on hardware, aiming to create reliable, real-time industrial applications.
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Joakim Flink **Hitachigymnasiet**

Joakim Flink is an AI researcher, educator, and entrepreneur with a strong focus on applied artificial intelligence in education and learning technologies. He teaches at Hitachi gymnasiets specialized tech education "Smart systems and products" which he founded in 2018. He founded Pladdra, an AI-driven platform designed to support schools with pedagogical, secure, and GDPR-compliant AI tools. At Mälardalen University, his research explores small language models and federated learning, aiming to make advanced AI more accessible, efficient, and trustworthy. With over a decade of experience bridging pedagogy and AI development, he contributes to national and international initiatives on AI preparedness, digital transformation in education, and the future of human–AI collaboration. He was finalist for "AI Swede of the year" in 2022 and has also worked together with AI Sweden.
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Joakim Lindén Saab

Joakim did his undergraduate studies at Linköping University, earning an M.Sc. in Applied Physics and Electrical Engineering (Y) with alignment towards Theoretical Physics, including a year abroad at RMIT in Melbourne. In 2006 he joined Saab as an FPGA Developer, working on several real-time embedded hardware projects in video. From 2014–2015 he worked at Amsterdam Scientific Instruments on CERN spinoff detector/X-ray camera technology, before returning to Saab as Technical Fellow in Video & Graphics Technology focusing on embedded image processing and Deep Learning. Since 2022 Joakim is pursuing his PhD on similarity metrics and quality evaluation of virtual 3D scenes for synthetic data generation. He defended his licentiate thesis in 2025.
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Martin Skoglund RISE Research Institutes of Sweden

Martin Skoglund is a senior specialist and PhD student at RISE Research Institutes of Sweden, in Borås, working in the unit for dependable transport systems. His research focuses on safety assessments for connected and automated systems, with a particular emphasis on transparency and trust in autonomous vehicles and AI-based cyber-physical systems. He has contributed to major European projects such as SUNRISE, which develops scalable safety frameworks for cooperative automated mobility, and AGRARSENSE, which applies advanced technologies to agriculture and forestry. With expertise in functional safety, cybersecurity, and AI, he has published widely on automated vehicles, risk assessment, and human–machine interaction.
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Sepehr Mousavi Swegreen

Sepehr Mousavi is Co-Founder and Chief Innovation Officer of Swegreen. A Swedish agtech company pioneering on-site vertical farming with its Farming-as-a-Service model. He leads Swegreen's R&D and innovation portfolio, driving AI-enabled, sustainable food production. Alongside his role at Swegreen, Sepehr is pursuing an industrial PhD at Mälardalen University, researching AI and data as enablers for sustainability. With a background spanning agricultural engineering, sustainability, technology, and international collaboration, he is passionate about transforming food systems toward resilience, efficiency and climate-positive impact.
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Stefan Marksteiner AVL

Stefan Marksteiner is a Senior Technology Scout for Cyber Security at AVL, based in Graz, Austria. His work focuses on emerging security technologies, with a particular interest in communication protocols, automotive security analysis, and formal methods. He is currently pursuing a PhD, aiming to complete it by the end of 2025. Stefan contributes to academic research, including TARA verification and implementation error analysis. His interdisciplinary approach bridges industrial innovation and academic rigor.
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Thorvaldur Jochumsson H$_2$solo

Thorvaldur Jochumsson is an industrial PhD student at Mälardalen University whose research focuses on functional safety in safety-critical systems, bridging safety engineering and hydrogen system reliability. He is also active in industry through roles at ALSTOM and H$_2$solo, contributing to software development and architectural solutions for dependable, safety-compliant systems. Thorvaldur holds an MSc in Computer Science and a BSc in Systems Engineering from the University of Skövde.

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Zafer Yigit Volvo Construction Equipment

Zafer Yigit is industrial PhD student at Mälardalen University from 2024. He holds a BS degree in electrical and electronics engineering from Eskisehir Osmangazi University in Turkiye (2009). He completed his MS degree in control and automation engineering at Istanbul Technical University in 2014. After his MS degree, he worked as a calibration and software engineer at Ford Motor Company in Turkiye. He started but dropped out his PhD in control and automation engineering at Istanbul Technical University (2022). He started working as on-board diagnostic software developer at Volvo CE in 2022. As of spring 2024, he is pursuing as industrial PhD student on developing generative digital twin framework for reliable and robust AI-powered prognostic systems at Mälardalen University.
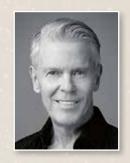
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Anders Eriksson Swegreen

Anders Eriksson is CEO of Swegreen AB, a Swedish agtech company pioneering on-site vertical farming with its Farming-as-a-Service model. He brings decades of international leadership experience, having served as CEO for public companies listed in Sweden, Norway and the Netherlands and successfully led joint ventures and mergers in the U.S. within the telecom sector. Since November, Anders has been leading Swegreen's global growth strategy, building on his strong track record in scaling innovative companies. His expertise spans corporate management, capital markets, and international expansion.

Andreas Hjertström Volvo Construction Equipment

Andreas Hjertström has a technical doctorate in computer science from Mälardalen University. He has for more than 10 years worked in advanced development at Volvo Construction Equipment. Since 2020 with a focus on research strategy and research collaborations where both companies and academia work together to solve the challenges we face. If we are to accelerate the transition and meet our ambitions, it is not only technologies areas such as automation, digitization and electrification alone that need to be in focus. Often, the complete system including soft aspects must be considered.

Baran Çürüklü Mälardalen University

Baran Çürüklü has received his PhD in AI from MDU in April 2005 on models of cortical networks and the information processing in the sensory cortex (primary visual cortex of cats and monkeys) was broadly the scope. Since 2007 he has worked in national projects on Human – industrial robot interaction (I-HRI, Robot Colleague), AI for Sustainable Food Production from Farm to Fork (Vinnova/FORMAS) and, since 2015, he is involved in a number national, DPAC, and international, eCraft2Learn (Horizon 2020), SWARMs (ECSEL JU), AFarCloud (ECSEL JU), NexTArc Chips JU) projects. These projects aim at designing multi-robot multi-human systems, strategies for adaptive autonomous agents, and emergence of complex systems and interactions.
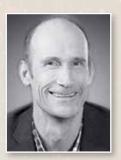baran.curuklu@mdu.se

Bogdan Timus TRATON R&D

Bogdan Timus is working with Perception for Autonomous Heavy Vehicles at Traton and is Industrial PhD advisor. He has been working with development and evaluation of perception algorithm, as research project manager. Currently his focus in on enabling development of multi-modal ML models for perception, as Data Acquisition Lead. Bogdan's research interest is efficient DNN architectures for multimodal 360 degrees perception for heavy vehicles, in highly dynamic environments. He is PhD in Communication Systems from KTH (2009) and has long experience from both academic and industrial research.

Christer Norström Mälardalen University

Christer Norström has extensive experience from the academic world as a professor of computer science, the export industry, and startups, including serving as CEO of the world-leading research institute RISE SICS and as co-founder of two startup companies. He is currently an adjunct professor at MDU. He also serves as chair of the board for the Hitachigymnasiet group in Västerås and Ludvika, Mälardalen International School, and Vattenfallgymnasiet in Forsmark, as well as chair of Fryxellska skolan. Christer is a member of the Royal Swedish Academy of Engineering Sciences. He has been actively working with AI solutions for 15 years, both in research and commercialization.
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Cristina Seceleanu Mälardalen University

Cristina Seceleanu's research centers on formal modeling and verification of real-time, adaptive embedded and cyber-physical systems. The goal is to provide rigorous guarantees that complex systems behave correctly and reliably, according to their requirements. Her recent work explores integrating machine learning with model checking for scalable verification of autonomous systems, verification of industrial-scale models, and model-based testing. At Mälardalen University (MDU), Cristina has served as research leader of the Computer and Data Science direction since 022, and head of the Formal Modeling and Analysis of Embedded Systems group since 2014. Cristina holds a Ph.D. in Computer Science from Åbo Akademi, Finland.
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Federico Ciccozzi Mälardalen University

Federico Ciccozzi is Full Professor of Computer Science at Mälardalen University (Västerås, Sweden), Head of Research Education in Embedded Systems, and lead of the Automated Software Language & Software Engineering group. His research spans model-driven and automated software engineering for embedded, safety-critical cyber-physical systems, with a strong focus on software language engineering for DSMLs: language/metamodel design, syntax/semantics and constraints, transformations and code generation, and compilation pipelines that compile verified models into efficient, platform-specific implementations with analysis, optimization, and traceability, incl. interpreters, static analysis, type systems, incremental builds.
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Fredrik Warg RISE Research Institutes of Sweden

Fredrik Warg holds a Ph.D. degree in computer engineering from Chalmers University of Technology, Sweden (2006). The doctoral research was focused on software parallelization using thread-level speculative execution. After a few years in the telecom industry, he joined RISE Research Institutes of Sweden (2014) and is now a Senior Researcher and Research Lead in the unit of Dependable Transport Systems. Current research interests include safety for connected automated vehicles, safe AI, safety/security interplay, and safety assurance methods. He has participated in over 15 national and European dependability-related research projects and led two national projects in the area of safety for automated vehicles.

Giuseppe Nebbione Mälardalen University

Giuseppe Nebbione is a Senior Lecturer at Mälardalen University (MDU) specializing in cyber-security, with a focus on threat modeling and penetration testing. He earned his PhD in Computer Science from the University of Pavia, Italy, and later conducted postdoctoral research at KTH Royal Institute of Technology in Stockholm. His current research interests include applying graph theory and domain-specific languages to penetration testing and security modeling, with the goal of improving systematic analysis of complex attack surfaces and enhancing security evaluation methods.
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Hans Hansson Mälardalen University

Hans Hansson has been Professor at Mälardalen University since 1997. He has played a central role in establishing and leading MDU's research in Embedded Systems, which today comprises more than 200 senior researchers and PhD students. He leads the university's strategic profile area Trusted Smart Systems. In recent years, he has been a driving force in advancing research on functional safety and cybersecurity, taking leading roles in large-scale national and EU projects as well as in industrial partnerships. He is also the founder of MDU's master's programme in Cyber-security and of professional education initiatives in software and embedded systems development for industry.
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Henrik Jäger H_2solo

Henrik holds a MSc in Chemical Engineering and has done research projects in material science together with big Swedish industrial partners during his time at Swerea (now Swerim, part of RISE). He has worked more than 15 years for heavy industry, ranging from paper & mill and injection moulding to ABBs division for measurement and analytics. At H_2solo Henrik work as an energy systems engineer, trying to invent new ways to store excess renewably energy. This role marries both his background as a material chemist with his work experience as an automation electrician. The work at H_2solo is combined with his other work as a part time farmer, an area where the green transition is highly needed.

Håkan Forsberg Mälardalen University

Håkan Forsberg has a Ph.D. in Computer Engineering from Chalmers University of Technology. In January 2025, he became a Docent and Associate Professor in Computer Engineering at MDU with focus on fault-tolerant systems. Håkan Forsberg previously worked at Saab for 18 years as a specialist in safety-critical electronics and computers. His main research includes fault-tolerant systems, design assurance strategies for dependable systems, and the use of modern microcontrollers and heterogeneous architectures (highly complex COTS) in safety-critical applications. His research also includes the use of machine learning (ML) in dependable systems including the use of ML in prognostics.
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Ingemar Söderquist Saab

Ingemar is Technical Fellow at Saab within the area Electronics Design in Avionics, and Adjunct Professor at KTH in Embedded Systems in Avionics. His research interest is safe, reliable and high-performance embedded real-time systems. Often with a holistic vertical view, that combines knowledge from high-level system design, software and hardware technology, architecture, down to the infrastructure on chip. He has more than 40 years' experience in research collaborations jointly run by industry and academia, national and international, with the objective to develop technology, methods and tools for design of Avionics. Ingemar received his M.S. degree in Electronic and Electrical Engineering from the University of Linköping, Sweden, in 1985, and the Ph.D. degree in Electronic Devices from the University of Linköping, Sweden, in 2002.

Kaj Hänninen Mälardalen University

Kaj Hänninen is an associate professor at Mälardalen University. Kajs research focuses on developing new methods and techniques to analyse safety-critical systems both from a safety and security point of view. Kaj has also had positions as consultant and systems expert coaching designers and architects in development of safety critical software. He has been responsible for managing safety audits and reviewing a number of forthcoming safety standards. He has also given courses in safety awareness for the industry.
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Kristina Lundqvist Mälardalen University

Kristina Lundqvist serves as the Professor of Dependable Software Engineering at the School of Innovation, Design and Engineering at Mälardalen University. Her research group on Safety-critical engineering focuses on bridging the gap between the theoretical foundations of dependability and industrial software development practices of complex dependable systems. Additionally, Prof. Lundqvist is the Director of the RELIANT industrial research school, Chariman of the MDU recruitment committee (engineering), and member of the MDU engineering committee (teknikutskottet). She received a Ph.D. in Computer Systems from Uppsala University in 2000. Prior to coming to Mälardalen University in 2007, she served on the faculty of the Department of Aeronautics and Astronautics at Massachusetts Institute of Technology (MIT).
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Ludvig af Klinteberg Mälardalen University

I am an Associate Professor in Applied Mathematics at the Department of Mathematics and Physics at Mälardalen University. My background and primary field is numerical analysis, where my research is focused on fast computational algorithms and high-order methods for solving PDEs. I have also worked for several years with development of ML-based perception systems for autonomous vehicles at Scania. At RELIANT my aim is to contribute to the graduate school through my joint experience in both computational mathematics and applied AI.
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Malin Rosqvist PiiA – Process industrial IT & Automation

Malin Rosqvist, Stakeholder engagement and industrial network. Malin Rosqvist is part of the management team for RELIANT, focusing on stakeholder engagement and industrial network in RELIANT and beyond. As program manager för the strategic innovation program PiiA, Process industrial IT & Automation, Malin coordinates efforts to increase digitalisation and automation to make industrial value chains more efficient. Malin has extensive experience in project and program management, research collaboration and innovation projects at both national and international level and has laid the foundation for several long-term collaborations. Industrial experience from the field of automation, both nationally and internationally.

Marino Mirkovic Volvo Construction Equipment

Marino Mirkovic M. Sc Computer Science is an experienced Manager with strong beliefs in value based and servant leadership. By growing the Individual's self-leadership capability in a team full of passion, I believe our autonomous teams will take the front position in driving technology disruptions. I am unpretentious and believe that good ideas can come from anyone. My curiosity in people and technology has led me to different positions during my career. It is the passion for making a difference that is driving me. I have experienced a variety of assignments from real-time programming to system engineering, project management, business development and CEO. I have been working as a Manager in VCE since 2013 for Electrical & Electronics Common Platforms and Controls & Diagnostics for engines.

Marjan Sirjani Mälardalen University

Marjan Sirjani is a Professor at Mälardalen University and leads the Cyber-Physical Systems Analysis research group. Her primary research interest is the application of formal methods in software engineering, particularly in the modeling and verification of concurrent, distributed, timed, and self-adaptive systems. Marjan and her group are pioneers in developing model checking tools and compositional verification techniques for actor-based models. She has worked on the analysis of actors since 2001 using the modeling language Rebeca (http://www.rebeca-lang.org). Her current focus is on safety and security assurance of cyber-physical and autonomous systems. Marjan has served as a program committee member and chair for several international conferences, including SEFM, iFM, FM, FMICS, and FSEN. She is also an editor for the journal Science of Computer Programming.
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Masoud Daneshtalab **Mälardalen University**

Masoud Daneshtalab is a full professor at MDU. He directs the DeepHERO Lab with more than 25 members, focusing on algorithm–hardware co-design (for FPGAs and GPUs), efficient and reliable AI, and deep learning acceleration. He is currently delving into the optimization and reliability of generative models (particularly VLMs, LLMs, and diffusion models), synthetic data generation, distributed AutoML, federated mixture of experts, and federated learning. He has authored over 250 publications, supervised 10+ PhD graduates, and developed open-source tools to improve efficiency and reliability of AI in safety-critical systems. Masoud has led projects exceeding €20M with industries in sectors such as automotive, avionics, and healthcare.
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Mehrdad Saadatmand **RISE Research Institutes of Sweden**

Mehrdad Saadatmand is a Senior Researcher in software engineering at RISE Research Institutes of Sweden in the city of Västerås where he also leads the Software Testing Group. Mehrdad holds a Ph.D degree from Mälardalen University in Sweden. He has extensive experience of working in various collaborative industrial research projects, particularly several large-scale European ones. His main research interests include software process automation and optimization, software testing, verification and validation, model-driven engineering, and AI-based software engineerin.

Mikael Ekström **Mälardalen University**

I received my PhD from Uppsala University in the field of physics in 1999 and started working as a senior lecturer in electronics at Mälardalen university in 2000. Since 2019 am I a professor in robotics, and my research involves autonomous vehicles, collaborative robots, sensor systems, and robotics for health care. Projects include autonomous sailboat, underwater vehicle, soccer playing robots, and a robot system to be used in the care of people with dementia. All projects include external partners, national as well as international, from both academia and industry.
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Mikael Sjödin **Mälardalen University**

At Mälardalen University, Mikael is focusing his research on new methods to construct software for embedded control systems in the vehicular and telecom industry. The current research goal is to find methods that will make software development cheaper, faster and yield software with higher quality. Concurrently, Mikael is also been pursuing research in analysis of real-time systems, where the goal is to find theoretical models for real-time systems that will allow their timing behavior and memory consumption to be calculated. Mikael received his PhD in computer systems 2000 from Uppsala University (Sweden). Since then he has been working in both academia and in industry with embedded systems, real-time systems, and embedded communications. Previous affiliations include Newline Information, Melody Interactive Solutions and CC Systems. In 2006 he joined MDU faculty as a full professor with specialty in real-time systems and vehicular software-systems.
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Monica Odlare **Mälardalen University**

I am a professor in Environmental Engineering with a PhD in Microbiology. My research is mainly focused on environmental engineering, water treatment, vertical indoor farming, renewable energy sources, and circular economy. I am active in the development of and teaching within our Master's Programme in Environmental Engineering for Sustainable Development and I teach in courses related to environmental engineering and statistics. I am very interested in web-based education and I have been active in the development of several online courses the last few years. As professor in environmental engineering, I try to combine research and education in co-production with our industrial partners. I am also supervisor for several PhD-students and I am also driving several international collaboration projects, for example with Texas State University and IIT Bombay.
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Nikola Petrovic received his M.Sc. in Engineering Electronics (2007) and Ph.D. in Electrical Engineering (2014) from Mälardalen University (MDU), Västerås, Sweden. He is a Senior Lecturer in the Medical Health Engineering (MHE) research group at MDU's Department of Innovation, Design and Engineering. His research focuses on the development and evaluation of microwave imaging systems and other medical imaging techniques, with expertise in electromagnetic field theory, antenna and sensor design, signal processing, and imaging algorithms for healthcare applications.
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Sasikumar Punnekkat **Mälardalen University**

Prof. Sasikumar Punnekkat is the leader of the Dependable Software Engineering research group at MDU. He was a Scientist Engineer at Indian Space Research Organization (1984-2004), Director of BITS-Pilani Goa (2015-2016) and Visiting researcher at Ericsson (2022-2024). His research targets development of methods and processes for engineering dependable software systems, with special focus on safety, security and timeliness. The safety and security implication of AI-based systems, usage of machine learning for threat detection and safety assurance of system of systems are some of the current focus areas. Punnekkat has 180+ publications (6 best paper awards). He is an associate editor of IEEE Transactions on Emerging Topics in Computing.
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Shahid Raza **Mälardalen University**

Shahid Raza is Professor of Cybersecurity at the University of Glasgow and Mälardalen University, and also serves as Research Director at Cybercampus Sweden and RISE. His current research focuses on IoT security, AI resilience, security for satellite communication, and the transition to post-quantum cryptography. He has been actively involved in shaping national and European initiatives on cybersecurity such as Cybercampus Sweden, Cybernode, and RISE Cyber Range. His career spans both academia and applied research, including leadership of one of Sweden's largest cybersecurity research groups at RISE. Shahid has led and participated in numerous national and international cybersecurity research projects. He holds an industrial PhD from Mälardalen University, an MSc from KTH, and a Swedish Docentship from Uppsala University, all in cybersecurity. His work on IoT security is highly cited, with over 7,200 citations across top-tier venues. [https:shahidraza.net].
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Simon Bouget RISE Research Institutes of Sweden

Simon Bouget is a Senior Researcher in the Cybersecurity Unit at RISE Research Institutes of Sweden, where he is involved in various European and Swedish projects. His research interests include Privacy and Security for Distributed Systems, notably for the IoT and automotive networks, and his current focus is on the Formal Verification of communication protocols and on leveraging TEEs (Trusted Execution Environments) to build secure architectures. Previously an ERCIM fellow postdoc, he also worked as a research engineer for KTH, Sweden, on Formal Verification. He completed his PhD in 2018 from the University of Rennes, France, on the design of self-organizing distributed systems. He is also an alumni from the French Grande École ENS Rennes.

Sina Sharif Mansouri Scania

Sina Sharif Mansouri obtained his Ph.D. degree from the Control Engineering Group in the Department of Computer Science, Electrical and Space Engineering at Luleå University of Technology. He was part of the CoSTAR team at Caltech during the DARPA Subterranean Challenge, where they won first place in the Urban Circuit. He also received Vattenfall's award for the best doctoral thesis in 2021. He is currently the R&D Technical Leader for the Perception of Autonomous Vehicles at Scania.

Thomas Gustafsson TRATON R&D

Thomas Gustafsson is Expert Engineer and is working with perception development for autonomous vehicles at Traton R&D and acts as industrial PhD advisor. Thomas received his PhD in computer science from Linköping University in 2007. He has a long experience including both product development and industrial research. His interests include application of foundation models in autonomous driving with a focus on efficient multi-modality.

Anders Söderberg Nordic Engineering Partner (now part of the Cicor Group)
Anders is an Associate Professor in Electronics with many years of experience in the electronics industry. He is the founder and former CEO of Nordic Engineering Partner (now part of the Cicor Group) with more than 50 employed engineers, former Head of R&D at NOTE (a Swedish EMS company), and previously Head of a development department at Ericsson focusing on innovative solutions for radio base stations. Since his university years, he has been the author or co-author of over 100 publications and holds more than 20 active patents.

Anna Ericson Öberg Volvo Construction Equipment
As a Research Strategy Manager at Volvo Construction Equipment, I concentrate on developing our strategic research portfolio by initiating and supporting collaborative research projects. I collaborate closely with universities and other organizations and manage our internal industrial doctoral network. Additionally, I serve part-time as an adjunct professor at Karlstad University, where I lead the research center DAMI and supervise a PhD student. Since my time as an industrial PhD student, my mission has always been to bridge the gap between academia and industry.

Azra Habibovic TRATON R&D
Azra is Technology Leader for Human Factors and Automation at TRATON R&D, the central research and development organization supporting four TRATON brands: Scania, MAN, International, and Volkswagen Truck & Bus. In this role, she leads the strategy and roadmap for research and advanced engineering in these areas. She holds a PhD in Vehicle Safety Systems (2012) and an MSc in Electrical and Electronics Engineering (2006), both from Chalmers University of Technology. Her research focuses on enhancing traffic safety and user experience through automation and connectivity.

Diana Unander **Linnaeus University, Linköping University**
Diana has been coordinating the industrial graduate school for Data Intensive Applications (DIA) at Linnaeus University. Here the main role to support the PhD-students and the industry partners to navigate between the different worlds of academia and industry. Since May 2025, Diana is also affiliated with Linköping University at IDA.

Thorvaldur Jochumsson **Mälardalen University, H_2solo**
Thorvaldur Jochumsson is an industrial PhD student at Mälardalen University whose research focuses on functional safety in safety-critical systems, bridging safety engineering and hydrogen system reliability. He is also active in industry through roles at ALSTOM and H_2solo, contributing to software development and architectural solutions for dependable, safety-compliant systems. Thorvaldur holds an MSc in Computer Science and a BSc in Systems Engineering from the University of Skövde.

Alexandre Justo Miro

All-Range Perception for Heavy Autonomous Vehicles

- This project proposes a groundbreaking shift in research towards robust and weather-resilient all-range perception systems, essential for enabling autonomy in heavy, large vehicles.
- Perception is a key part of any autonomous vehicle. Currently, the state-of-the-art perception datasets and methods primarily focus on passenger vehicles, where sensors are installed closely and synced; and urban environments, where movements are typically slow. However, autonomous heavy trucks pose different challenges, opportunities, and safety requirements than passenger cars.

Asrin Abdollahi

Trusted Execution Environment (TEE) for Low-Power RISC-V IoT Devices

- Securing IoT devices can be challenging due to their small size, limited battery power, and resource constraints. This work addresses these issues by focusing on the high-level design, a lightweight Trusted Execution Environment (TEE) customised for tiny IoT devices. The TEE is designed to protect sensitive data and code by creating a private operating environment within the processor, isolated from the main operating system (OS). Protecting IoT devices at the hardware level is essential for mitigating the attack surface.

Elias Kettunen

Real-Time Optimization of Energy Systems through Edge AI

- The purpose of the project is to explore Edge AI for energy systems, utilizing AI models on open-source hardware to enhance decision-making and system efficiency. The project aims to develop scalable, lightweight and efficient Edge solutions for real-time challenges.
- The rapid expansion of Industrial smart systems and embedded intelligence has created a pressing need for real-time, autonomous optimization in energy systems. Traditional cloud-based AI solutions often face challenges such as high latency, network dependency, and security risks, making them less suitable for industrial applications that require immediate, on-device decision-making.

Joakim Lindén

Synthetic Data in Data-driven Systems: Methods for generating representative data from synthetic sources in the visual domain

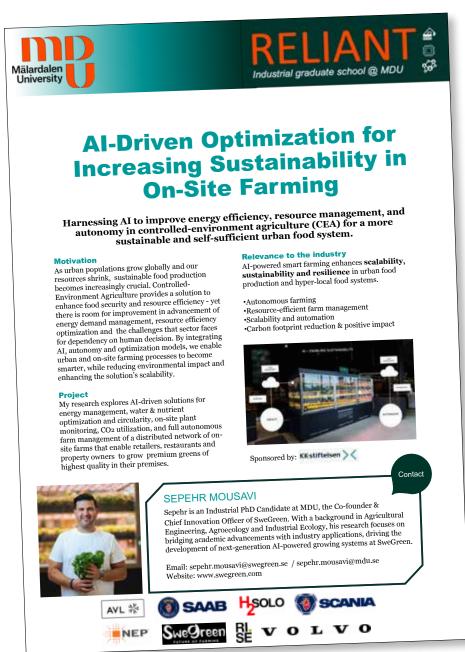- A large part of the accuracy and robustness of a perception AI model is accredited to the data it has been trained on. It is the intention of this project to emphasize the dataset side of the problem, including novel methods of data generation and augmentation. Expected outputs are methods to automize the data generation process, allowing directed requirements-driven synthetic data sampling of high fidelity images to target perception problems.

Martin Skoglund

Safeguarding the threshold for releasing automated vehicles to the market

- The automotive sector is undergoing significant shifts, including transitioning to fossil-free propulsion and under cooperative, connected, and automated mobility (CCAM) frameworks. Although CCAM can contribute to global sustainability goals, public release of highly automated systems remains limited. Fail-operational designs, complex environments, and cybersecurity threats underscore the critical interplay of safety and security. Transparent validation and independent oversight are crucial to safeguard the threshold for introducing automated vehicles to the market.
- An independent third party can offer a neutral framework for assessing technical compliance at each developmental milestone, increasing transparency and reinforcing public confidence. Addressing safety and safety-informed security requires prioritizing some aspects within a vast problem space, inevitably leaving some areas unexplored.

Mälardalen University

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AI-Driven Optimization for Increasing Sustainability in On-Site Farming

Harnessing AI to improve energy efficiency, resource management, and autonomy in controlled-environment agriculture (CEA) for a more sustainable and self-sufficient urban food system.

Motivation
As urban populations grow globally and our resources shrink, sustainable food production becomes increasingly crucial. Controlled-Environment Agriculture provides a solution to enhance food security and resource efficiency - yet there is room for improvement in advancement of energy demand management, resource efficiency optimization and the challenges that sector faces for dependency on human decision. By integrating AI, autonomy and optimization models, we enable urban and on-site farming processes to become smarter, while reducing environmental impact and enhancing the solution's scalability.

Project
My research explores AI-driven solutions for energy management, water & nutrient optimization and circularity, on-site plant monitoring, CO_2 utilization, and full autonomous farm management of a distributed network of on-site farms that enable retailers, restaurants and property owners to grow premium greens of highest quality in their premises.

Relevance to the industry
AI-powered smart farming enhances **scalability, sustainability and resilience** in urban food production and hyper-local food systems.

- Autonomous farming
- Resource-efficient farm management
- Scalability and automation
- Carbon footprint reduction & positive impact

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Contact

SEPEHR MOUSAVI

Sepehr is an Industrial PhD Candidate at MDU, the Co-founder & Chief Innovation Officer of SweGreen. With a background in Agricultural Engineering, Agroecology and Industrial Ecology, his research focuses on bridging academic advancements with industry applications, driving the development of next-generation AI-powered growing systems at SweGreen.

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Sepehr Mousavi

AI-Driven Optimization for Increasing Sustainability in On-Site Farming

- Harnessing AI to improve energy efficiency, resource management, and autonomy in controlled-environment agriculture (CEA) for a more sustainable and self-sufficient urban food system.
- As urban populations grow globally and our resources shrink, sustainable food production becomes increasingly crucial. Controlled-Environment Agriculture provides a solution to enhance food security and resource efficiency - yet there is room for improvement in advancement of energy demand management, resource efficiency optimization and the challenges that sector faces for dependency on human decision. By integrating AI, autonomy and optimization models, we enable urban and on-site farming processes to become smarter, while reducing environmental impact and enhancing the solution's scalability.

Stefan Marksteiner

Learn, Check, Test - Security Test Generation Utilizing Automata Learning and Model Checking

- With the rising complexity and regulatory pressure of automotive systems, analyzing and testing the security of automotive systems has become an extremely challenging task. Furthermore, both the focus on the viewpoint of adversaries and the long supply chains in the industry demand black box verification methods. We therefore utilize model-based methods for automating test case generation in both white- and black-box scenarios. The focus lies on the security of communication protocols in vehicular systems.
- To provide both more efficient and more rigorous testing of system correctness from a cybersecurity perspective, structuring and automation is necessary.

Thorvaldur Jochumsson

Hydrogen Safety: Bridging Legislation, Standardisation and Safety Engineering

- Ensuring hydrogen safety requires a seamless integration of legislation, standardisation, and engineering. This work explores how bridging regulatory gaps and streamlining standards enhance hydrogen safety engineering, ultimately improving efficiency in hydrogen application development.
- Hydrogen promises to be a key solution to today's environmental challenges and energy crisis. However, its unique properties present significant safety challenges – where compliance gap, standardisation gap or standardisation overreachcan compromise safety or hinder innovation. To fully unlock hydrogen's potential, research and policy efforts must focus on balancing legislation and standardisation to effectively support safety engineering.

Zafer Yigit

Generative Digital Twin Framework for Reliable and Robust AI-Powered Prognostic Systems

- The construction and mining sectors heavily rely on construction equipment to ensure smooth and efficient operations. However, unexpected machine failures can lead to costly downtimes and reduced productivity. Traditional diagnostic systems detect failures only after they occur, making preventive measures difficult and extending repair times.
- This study explores Machine Learning-powered Prognostic and Health Management (PHM) systems, which predict failures before they happen for diesel engine systems, we analyze how PHM improves maintenance planning, minimizes downtime, and enhances operational efficiency.

Joakim Flink

Heading: FedLoRASwitch: Efficient Federated Learning via LoRA Expert Hotswapping and Routing

- Adapting large language models (LLMs) to diverse tasks in federated settings is hindered by communication over-head, privacy constraints, and client heterogeneity. We introduce FedLoRASwitch, a framework that trains multiple specialised Low-Rank Adaptation (LoRA) experts on distributed clients with-out sharing raw data.

RELIANT

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≫ Facts about Mälardalen University

MDU is one of Sweden's foremost HEIs in terms of collaboration, which is a natural part of the University's DNA. The University was established in 1977 as a result of collaboration with industry. This approach has been developed over the years, and today the University has several strategic collaboration agreements and projects in place with both the private and public sectors. Collaboration is an integral part of our education and research at MDU.

Our strategic collaboration partners: ABB, Hitachi Energy, Alstom, Eskilstuna Energi & Miljö, Eskilstuna Municipality, Mälarenergi, VafabMiljö, Volvo Construction Equipment, Sparbanken Rekarne and Västerås City.

At MDU, there are several major strategic initiatives that bring together research, education, innovation, and collaboration around some of society's greatest challenges.

Among our major initiatives are groundbreaking projects in artificial intelligence and interdisciplinary studies that together shape the sustainable society of the future.

At MDU research is conducted in nine research specialisations that promote knowledge and development, for Swedish industry and peoples' welfare, but also for solving the many challenges facing society.

Research

- Computer and Data Science
- Educational Sciences and Mathematics
- Electrical and Computer Engineering
- Future Energy
- Health and Welfare
- Industrial Economics and Organization
- Innovation and Product Realisation
- Medical and Health Engineering
- Software and Systems Engineering
- Doctoral students: 244
- Professors: 73
- International agreements: 140 across the globe

Education

- Students: 19 000
- Study programmes: 58
- Courses: 900
- Teaching staff: 566