

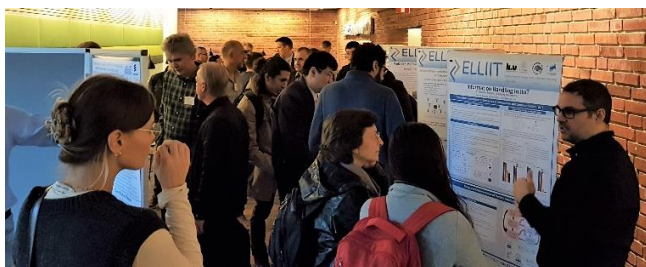
## News

### ELLIIT Annual Workshop 2021, 26-27 October in Lund

The ELLIIT annual workshop successfully took place at Lund University. On October 26-27, 2021, almost 200 participants from ELLIIT's participating universities (LiU, LU, BTH and HH), industrial partners and invited guests could meet for scientific discussions and networking.

Since 2020, ELLIIT has grown with new projects including postdoc and PhD projects, Gender Program projects and infrastructure initiatives. Researcher leaders presented their projects and discussed their results. Two keynote speakers from academia and one keynote speaker from industry discussed, respectively, research and collaboration on digitisation and automation of production technologies, on chordal codes for chip-to-chip communication and how 6G will enable a cyber-physical continuum blending the physical real world with a programmable digital representation of that same world. The workshop ended with four mini-workshops where ELLIIT researchers could discuss results and lessons-learned from completed projects.

A big thank you to the workshop organizers Michael Lentmaier and Volker Krueger.



### ELLIIT Annual Workshop 2022

The next ELLIIT workshop will be hosted by Linköping University, starting at 10:00 on October 19<sup>th</sup> and ending after lunch (13:00) on October 20<sup>th</sup>. The workshop organizers are Fredrik Lindsten (IDA, LiU) and Zheng Chen (ISY, LiU).

## Meet the new ELLIIT Recruited Faculty

### Zheng Chen

is an Assistant Professor at the Division of Communication Systems, Department of Electrical Engineering, Linköping University, Sweden. Her research interests include wireless communications and signal processing for distributed intelligent systems, and large-scale complex networks. She is the recipient of the 2020 IEEE Communications Society Young Author Best Paper Award. She has served as TPC member for several technical symposia at IEEE ICC and GLOBECOM in 2017-2022. She has served as workshop co-chair of 2021 IEEE GLOBECOM Workshop on “Wireless Communications for Distributed Intelligence”. She is currently co-supervisor of 3 Ph.D. students at LiU.



### Farnaz Adib Yaghmaie

started her position as an Assistant professor at ISY/Automatic Control, Linköping University from January 2022. She received her Ph.D. degree from the school of Electrical and Electronic Engineering, Nanyang Technological University (EEE-NTU), Singapore in 2017. She is the recipient of the best thesis award from EEE-NTU among 160 Ph.D. students. Her current research interest is reinforcement learning for controlling dynamical systems.



### Susanna de Rezende

started as Assistant Professor at the Department of Computer Science, Lund University, on December 1, 2021. She works in the area of complexity theory. Susanna received her

Ph.D. from KTH in 2019, and was awarded Prize for Excellent Doctoral Dissertation by the Stockholm Mathematics Centre. She has been a postdoc at the Institute of Mathematics of the Czech Academy of Sciences on a KAW fellowship, and also a Research Fellow at the Simons Institute for the Theory of Computing, Berkeley.



**Viktor Larsson** started at an Associate Senior Lecturer at the Department of Mathematics, Lund University, in April, 2022. After receiving his PhD in mathematics in 2018 from Lund University, he spent a couple of years as a

postdoc and senior researcher at the Computer Vision and Geometry group lead by Marc Pollefeys at ETH Zurich. His research is mainly focused on robust estimation problems that appear in 3D computer vision (e.g. Structure-from-Motion, visual localization, SLAM, and dense geometry estimation). Currently he is exploring how to best integrate deep learning with classical geometry-based pipelines. In particular, identifying and replacing hand-crafted heuristics or implicit assumptions with more data-driven alternatives.

# Research Highlights

## OpenModelica.jl a Julia-based Modelica compiler supporting variable structure system

Adrian Pop (LiU/IDA) and John Tinnerholm (LiU/IDA).

Multi-mode and reconfiguration support has been added recently to OpenModelica via the new Julia based framework (<https://github.com/JKRT/OM.jl>). Because the entire framework is written in Julia, reconfiguration of models via JIT recompilation can be triggered at runtime. An example of such functionality (to our knowledge not existing in any current Modelica tools) is given below. Modelica has been extended with a new operator recompilation that can currently change a structural parameter during runtime. This is just a proof-of-concept, any type of change to the original model could be supported.

<pre>model ArrayChange   parameter Integer N = 10;   Real x[N](start = {i for i in 1:N}); equation   x = {der(x[i]) for i in 1:N};   when time &gt; 0.5 then     // change N to 20 after 0.5s, recompile and continue the simulation     recompilation(N, 20);   end when; end ArrayChange;</pre>	<pre>import OM using Plots  arrayChangeResults = OM.runModelFM(   "ArrayChange",   "./Models/VSS/ArrayChange.mo",   startTime=0.0, stopTime=1.0,   mode = OMBackend.MTK_MODE)  p1 = plot(arrayChangeResults[1]; legend = false) p2 = plot(arrayChangeResults[2]; legend = false) plot!(p1, p2)</pre>
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Figure 1. Modelica code with extensions and the Julia script to run the Modelica code.

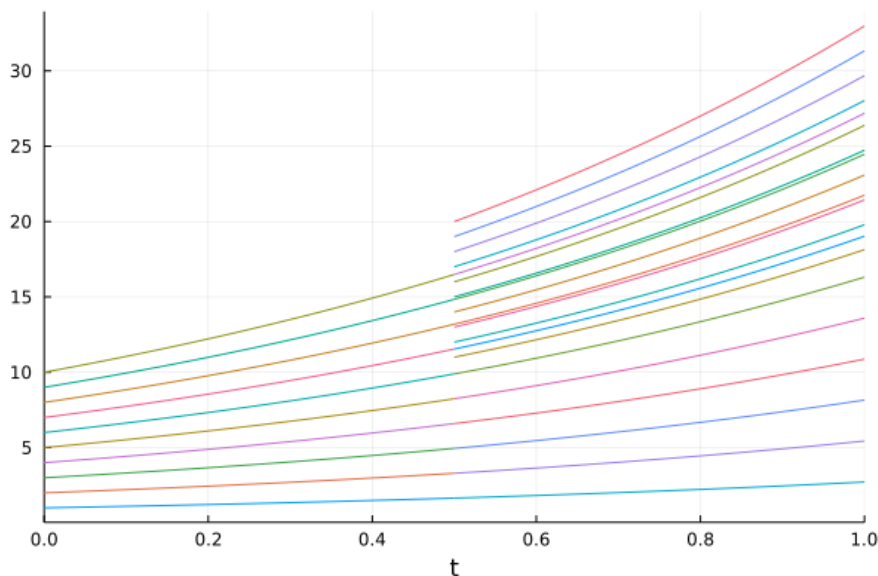


Figure 2. Simulation of the Modelica model. During simulation a reconfiguration is triggered via recompilation and the model grows in size.

## Unreliable V2X Communication in Cooperative Driving: Safety Times for Emergency Braking

Alexey Vinel (HH)

Cooperative driving is a promising paradigm to improve traffic efficiency and safety. In congested traffic scenarios, such cooperation allows for safe maneuvering and driving with small inter-vehicle spatial gaps. The vehicles involved coordinate their movements in real-time and continuously update each other about their maneuver execution status by means of Vehicle-to-Everything (V2X) communication. However, unreliable V2X communication increases the Age of Information (AoI) of vehicles' status updates, posing a challenge in situations where emergency braking is required during cooperative maneuvering. To address the interplay between unreliable V2X communication and the resulting impact on traffic safety, we introduce a so-called safety time function, specifically designed for cooperative driving use-cases. The safety time function provides the time available for a vehicle to react to an unexpected event of another vehicle – such as emergency braking to avoid a collision. We provide a computationally efficient algorithm for the computation of safety time functions, which allows for efficient and safe cooperative maneuver planning – even in dense traffic scenarios with many vehicles involved. We show the applicability of our proposed safety time function based on the assessed communication quality for IEEE 802.11p-based V2X communication to meet safety constraints in dense vehicular traffic.

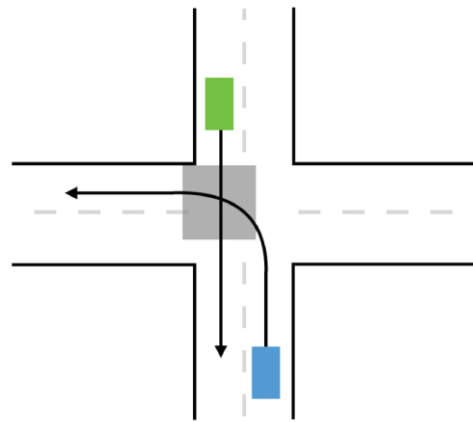


Figure 1. Illustration of main problem.

J. Thunberg, D. Bischoff, F. A. Schiegg, T. Meuser and A. Vinel, "[Unreliable V2X Communication in Cooperative Driving: Safety Times for Emergency Braking](#)," in *IEEE Access*, vol. 9, pp. 148024-148036, 2021.

## A mathematical model may give more efficient climate talks

Claudio Altafini (LiU/ISY)

Our paper entitled "[Achieving consensus in multilateral international negotiations: The case study of the 2015 Paris Agreement on climate change](#)" published on *Science Advances*, was highlighted on the [LiU News](#) and received attention from several news outlets, like [ScienceDaily](#) and [PhysOrg](#). The paper uses a mathematical model to describe how a complex multilateral agreement can be achieved through negotiations. An agreement can be represented as achieving a consensus, and the model we developed achieves consensus even though all participants (in this case nearly all countries on the planet) try to defend their own interests. It allows to quantify the "social power" of each country in the negotiation process.





The timeline illustrates the progression of the GSP review process. The negotiation phase, spanning from 1995 to 2014, includes several GSP reviews and meetings. The approval phase, spanning from 2014 to 2015, includes the final GSP review. Key events are marked with dates and meeting names, and network diagrams show the relationships between different entities involved in the process.

**negotiation phase**

**approval**

01-03/10/2004 Meeting SCI

07-10/10/2004 Meeting AFS

08-11/10/2004 Meeting CTCN

24-26/11/2004 Meeting CDM-88

16-20/02/2005 Meeting CDM-88

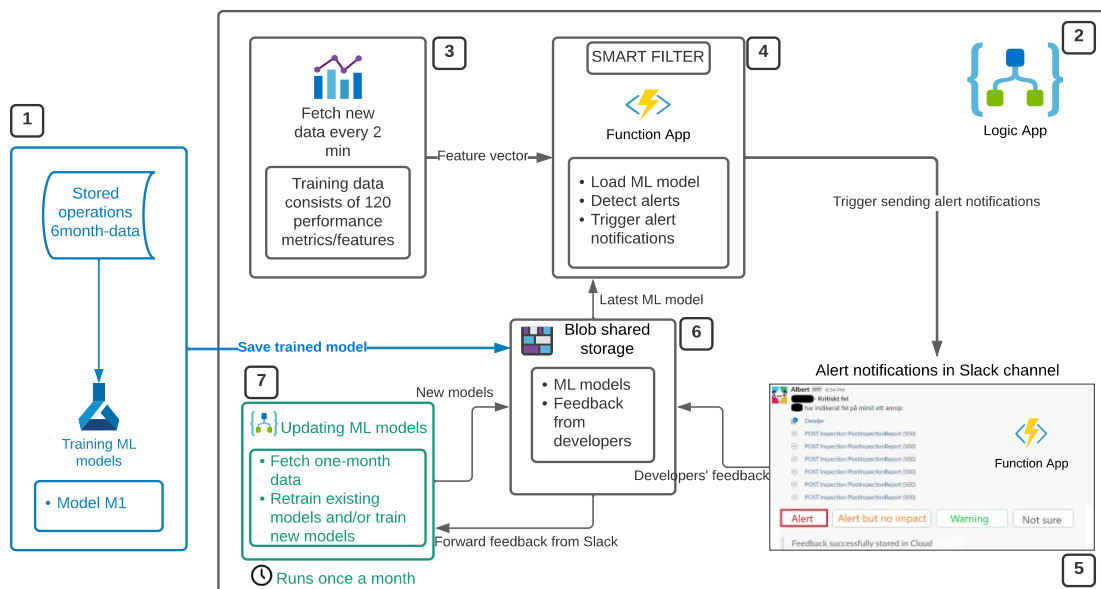
01-11/10/2004 GSP

Figure 1: Social power of various countries. The plot shows the mean social power (red dot) and confidence interval (horizontal line) for 30 countries. The countries are ordered by their mean social power, with Japan at the top and Malaysia at the bottom. The x-axis represents social power from 0.00 to 0.16.

Country	Mean Social Power (approx.)	Lower CI (approx.)	Upper CI (approx.)
Japan	0.155	0.150	0.160
European Union	0.150	0.145	0.155
Australia	0.145	0.140	0.150
USA	0.140	0.135	0.145
South Africa	0.135	0.130	0.140
Panama	0.130	0.125	0.135
Argentina	0.125	0.120	0.130
Peru	0.120	0.115	0.125
Belgium	0.115	0.110	0.120
Russia	0.110	0.105	0.115
South Korea	0.105	0.100	0.110
India	0.100	0.095	0.105
New Zealand	0.095	0.090	0.100
Ghana	0.090	0.085	0.095
Namibia	0.085	0.080	0.090
Tanzania	0.080	0.075	0.085
Mozambique	0.075	0.070	0.080
Iceland	0.070	0.065	0.075
Russia	0.065	0.060	0.070
Nigeria	0.060	0.055	0.065
Luxembourg	0.055	0.050	0.060
Canada	0.050	0.045	0.055
Bulgaria	0.045	0.040	0.050
Uganda	0.040	0.035	0.045
Thailand	0.035	0.030	0.040
Switzerland	0.030	0.025	0.035
Brazil	0.025	0.020	0.030
Egypt	0.020	0.015	0.025
Viet	0.015	0.010	0.020
Bangladesh	0.010	0.005	0.015
Samoa	0.005	0.000	0.010
Portugal	0.000	-0.005	0.005
Norway	-0.005	-0.010	0.000
Malawi	-0.010	-0.015	-0.005
Chile	-0.015	-0.020	-0.010
Qatar	-0.020	-0.025	-0.015
Morocco	-0.025	-0.030	-0.020
Netherlands	-0.030	-0.035	-0.025
Malaysia	-0.035	-0.040	-0.030

*Emelie Engström (LU/CS)*

New research addressing the software engineering challenges in the borderline between development and operations in a DevOps context was initiated by researchers from LU/CS: Adha Hrusto, Per Runeson and Emelie Engström. In collaboration with a local case company, feedback from operations to development was studied and several points of improvements with respect to alert flooding was identified. [1] A smart filter for optimizing incoming alerts from a system of independent microservices in operation was proposed as well as a framework for implementing, training, and evaluating such filter in operation. [2]

A Hrusto, P Runeson, E Engström - *SN Computer Science*, 2021

[2] Optimization of Anomaly Detection in a Microservice System Through Continuous Feedback from Development. A Hrusto, E Engström, P Runeson – *ICSEW SESoS*, 2022

# Lessons learned from an interactive review on ML-testing with Axis Communications

Emelie Engström (LU/CS)

As a response to the growing interest in both industry and academia in machine learning (ML) testing, we investigated the match between research and practice through an interactive review. Four researchers from LU/CS and four practitioners from Axis Communications reviewed a set of 180 primary studies on ML testing from a perspective of applicability and relevance for practice. Following the guidelines of interactive reviews, intermediate results on ML-testing were produced, such as a SERP taxonomy, a list of identified practical challenges, a mapping of these to the literature, and a feasibility analysis of the most promising approaches for data testing.



[1] Exploring ML testing in practice – Lessons learned from an interactive rapid review with Axis Communications. Q Song, M Borg, E Engström, H Ardö, S Rico

## Special issue of IEEE Software on Data Collaboration

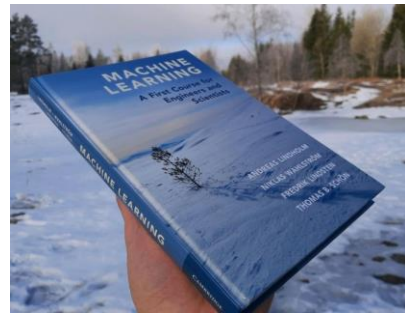
Data provisioning becomes ever more important for AI/ML systems. Collaborative approaches to acquire and maintain data are discussed in the special issue of IEEE Software, Feb 2022, edited by LU/CS researchers Johan Linåker and Per Runeson.

Linåker, J., P. Runeson, A. Zuijderwijk, and A. Brock (2022). Collaborative Aspects of Open Data in Software Engineering. *IEEE Software* 39, 31–35.

## Machine Learning: A First Course for Engineers and Scientists

Fredrik Lindsten (LiU/IDA)

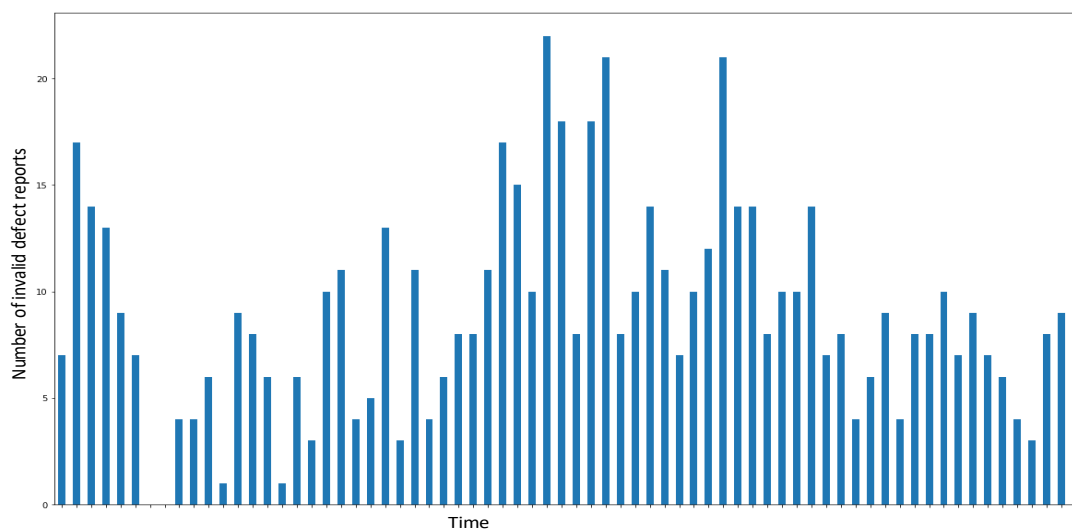
The introductory textbook *Machine Learning: A First Course for Engineers and Scientists*, co-authored by ELLIIT Faculty Fredrik Lindsten (LiU/IDA) together with Andreas Lindholm (Annotell), Niklas Wahlström (UU) and Thomas Schön (UU), has been published by [Cambridge University Press](https://www.cambridge.org/9780521876223). A free pdf version of the book is available at <https://smlbook.org>



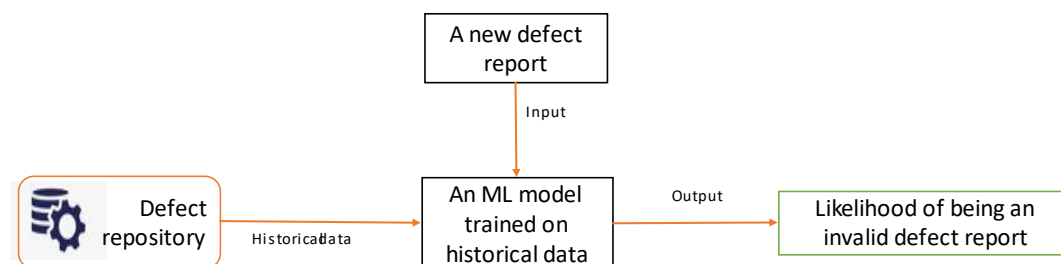
## Automation to support identification and management of invalid defect reports

Muhammad Laiq (BTH)

Software development companies spend considerable time on resolving defects found in their products. However, defect reports might be invalid, i.e. not pointing to a valid flaw in the product. Expensive resources and time are expended on invalid defect reports before discovering that they are invalid. The figure below depicts the prevalence of invalid reports over time for one of the products at a case company.



In a collaborative project with an industrial partner, researchers from BTH and LU have developed machine learning tools that can help to confidently flag invalid defect reports.



The results will enable several practical use-cases like introducing additional reviews or down prioritization of the flagged defect reports.

## Invited Talks

- Christoph Kessler (LiU/IDA) held a keynote presentation about high-level portable programming of heterogeneous parallel systems at the PDP-2021 conference, and an invited presentation at the ScienceCloud'21 workshop.
- Nikolaos Pappas (LiU/ITN) gave a talk on “Semantics-Empowered Communication for Networked Intelligent Systems” at Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg on 29 Nov. 2021.
- Nikolaos Pappas (LiU/ITN) gave a talk on “Age and Semantics of Information” at One6G on 16 March 2022.
- Nikolaos Pappas (LiU/ITN) will give a tutorial on “Semantics Communications for Future Wireless Communications” at Spring School 2022: Emerging and future communication networks: technologies, architectures, and tools, DigiCosme, Paris, France, April 2022.
- Nikolaos Pappas (LiU/ITN) will give a tutorial on “Age of Information in Wireless Networks: Fundamentals and Applications”, in the IEEE ICC 2022.
- Per Runeson (LU/CS) gave talks on Open Data Ecosystems at several occasions during the fall. In September at Graz Symposium Virtual Vehicle, <https://www.gsvf.at>, in November at Software Technology Exchange Workshop (STEW'21) organized by Swedsoft, at internetdagarna and in December as keynote of the 9th Swedish Workshop on Data Science (SweDS21).
- Tom Ziemke (LiU/IDA) will give a keynote talk on mental state attribution and explainability in human-robot interaction at the workshop “Behavior Adaptation, Interaction and Learning for Assistive Robotics” (BAILAR 2022), held in conjunction with the 31<sup>th</sup> IEEE International Conference on Robot and Human Interactive Communication (RO-MAN 2022) in August 2022.

## Awards and Appointments

- Buon Kiong Lau (LU/EIT) was elevated to IEEE Fellow on 1 January 2022 for contributions to multi-antenna systems in wireless communications. He has been active in the design and evaluation of multiple-input multiple output (MIMO) antenna systems, which have been mainly applied to smartphones and base stations. He has also contributed to multi-antenna design for vehicular and medical applications.
- Carina Geldhauser was elected member of the Global Young Academy. This is the international equivalent to Sveriges Unga Akademi. <https://www.maths.lu.se/nyheter/visa-nyhet/article/carina-geldhauser-invald-i-global-young-academy/>
- Elizabeth Bjarnason, LU/CS, was nominated for Best Paper at ESEM Conference, Sept 2021, for paper “A Model of Software Prototyping based on a Systematic Map” by Bjarnason, Lang, Mjöberg.
- Muhammad Usman was appointed Docent in Software Engineering at BTH in January 2022.



- The work [“The Cost of Delay in Status Updates and Their Value: Non-Linear Ageing”](#) by Antzela Kosta, Nikolaos Pappas, Anthony Ephremides, and Vangelis Angelakis, has been selected for the Best Student Journal Paper Award in Swe-CTW 2021.
- Simin Nadjm-Tehrani, LiU/Dept of Computer and Information Science was elected as a member of Swedish engineering academy (IVA) within its Information Technology division.

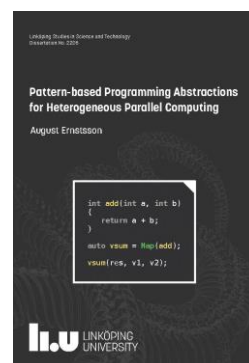
## Program chairs and Editorships

- Buon Kiong Lau (LU/EIT) is the Guest Editor for the upcoming special issue (to be published April 2022) on “Characteristic Modes: Into the Mainstream and the Path Beyond” in the IEEE Antennas and Propagation Magazine. The Special Issue consists of five invited tutorial style contributions, covering the main developments in the field of characteristic mode analysis since it became popular as a research topic in the past decade. The special issue is a major joint effort of Characteristic Modes Special Interest Group (CM-SIG, [www.characteristicmodes.org](http://www.characteristicmodes.org)), a community of over 90 member institutions formed to promote and coordinate research activities in this field.
- Buon Kiong Lau (LU/EIT) is one of several Guest Editors for the upcoming special issue on “Artificial Intelligence in Radio Propagation for Communications” in the IEEE Transactions on Antennas and Propagation. He has also contributed to the two invited articles in the special issue. The special issue aspires to collect the latest advancements in this exciting field, focusing on aspects in which AI techniques have been found to make significant impact on traditional propagation research.
- Emma Söderberg (LU/CS) is program chair for <Programming>'21 which ran onsite in Porto in March and online in April, which builds on Vol. 6 of the Programming Journal, for which Emma was Associate Editor.
- Emma Söderberg (LU/CS) joined the steering committee of the ACM SIGPLAN International Conference on Software Language Engineering (SLE).
- Erik G. Larsson (LiU/ISY) serves at workshop co-chair at IEEE ICC 2022 and awards chair of IEEE WCNC 2022.
- Görel Hedin (LU/CS) chairs the 2022 nomination committee for the AITO Dahl-Nygaard Prizes, <http://www.aito.org/Dahl-Nygaard/>
- Luke Church (LU/CS) is virtualisation and publicity chair of <Programming>'21.
- Martin Sjölund, Lena Buffoni, Adrian Pop, and Lennart Ochel are editors for [Proceedings of 14th Modelica Conference 2021](#), Linköping, Sweden, September 20-24, 2021.
- Martin Sjölund (LiU/IDA), Peter Fritzson (LiU/IDA), Lena Buffoni (LiU/IDA), Adrian Pop (LiU/IDA), and Lennart Ochel (RISE) are editors for Special Issue of [Electronics](#): "Selected Papers from Modelica Conference 2021".
- Nikolaos Pappas (LiU/ITN) served as a symposium co-chair for
  - IEEE International Conference on Communications (ICC) 2022
  - IEEE Wireless Communications and Networking Conference (WCNC) 2022

- Simin Nadjm-Tehrani, LiU/Dept of Computer and Information Science, serves as program chair for the European Dependable Computing Conference (EDCC) 2022, to be held Saragoza, Spain in September 2022. The conference is soliciting papers with a deadline in March. More info: <https://webdiis.unizar.es/EDCC22>
- Thomas Johansson, (LU/EIT), serves as program co-chair for PQCrypto 2022, the 13th International Conference on Post-Quantum Cryptography to be held September 28–30, 2022.
- Thomas Johansson, (LU/EIT) is serving as Associate Editor for IEEE Trans. On Information Theory (second term).
- Tom Ziemke (LiU/IDA) is technical program committee co-chair for the 2022 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA), held in June 2022.
- Tom Ziemke (LiU/IDA) is editing a special issue on “Intentions in Human-Robot Interaction” for the journals Frontiers in Neurorobotics, Frontiers in Psychology, and Frontiers in Robotics & AI, together with Serge Thill at the Donders Institute for Brain, Cognition & Behaviour, Netherlands.

## PhD theses

- August Ernstsson: “[Pattern-based Programming Abstractions for Heterogeneous Parallel Computing](#).” Linköping University, defended 15 March 2022. The main supervisor is Christoph Kessler (LiU/IDA). The thesis presents the design and implementation of the SkePU embedded domain-specific language, based on modern C++, for high-level, single-source, portable programming of applications for transparent, auto-tunable execution on heterogeneous parallel systems and clusters. The framework software is available (open-source) at <https://skepu.github.io>
- Emmanouil Fountoulakis (LiU/ITN) successfully defended his PhD in October 2021, with the title “[Performance and Optimization Aspects of Time Critical Networking](#)”.
- Galina Sidorenko (HH) successfully defended her Licentiate’s thesis with the title “[Safety of Cooperative Automated Driving: Analysis and Optimization](#)” on March 3. The main supervisor is Alexey Vinel and the co-supervisor is Johan Thunberg.
- Jing Yang (LU/EIT), [Contributions to Confidentiality and Integrity Algorithms for 5G](#), in December 2021.
- Jonas Nordlöf (LiU/ISY) successfully defended his Licentiate’s thesis with the title “[On Landmark Densities in Minimum-Uncertainty Motion Planning](#)” on March 15. The main supervisor is Daniel Axehill and the co-supervisor is Gustaf Hendeby.



- Rasmus Ros, LU/CS, successfully defended his PhD thesis, entitled “Understanding and Improving Continuous Experimentation: From A/B Testing to Continuous Software Optimization” on March 4. <https://portal.research.lu.se/en/publications/understanding-and-improving-continuous-experimentation-from-ab-te> Rasmus is now with AFRY.
- William Lövfors, A comprehensive dynamic model of the adipocyte, Linköping University, will be defended June 10. William's webpage: <https://liu.se/en/employee/willo18>
- Zahra Chamideh, PhD student in project B05, completed her Licentiate thesis in November 2021. The title of the thesis is “Safe and Robust Autonomous Intersection Management Methods”.
- Özgecan Özdoğan defended successfully defended her PhD thesis, entitled “[Signal Processing Aspects of Massive MIMO and IRS-Aided Communications](#)” on February 23. The main supervisor is Emil Björnson and the co-supervisor is Erik G. Larsson.

## Organized conferences and workshops

- Adrian Pop and Martin Sjölund (LiU/IDA) organized 14th International Modelica Conference, Online, 20–24 September, 2021.
- Adrian Pop and Martin Sjölund (LiU/IDA) organized [OpenModelica Annual Workshop](#). Online. 31 January, 2022.
- Gunnar Cedersund's group at Linköping University co-organizes the Workshop on Modelling in Biology and Medicine 23-24th of May 2022 in Linköping. The goal is to bring together young researchers in Sweden working on the border of mathematics, biology, and medicine. Deadline April 22<sup>nd</sup> for posters and presentations, and May 16<sup>th</sup> for observers. See <https://mbm.systemsbiology.se/>
- Gunnar Cedersund's group also co-organizes BME@LIU - Biomedical Engineering at LiU – Annual Conference 28 April between 8 – 17 o'clock. BME – biomedical engineering, or simply MedTech – lies at the intersection of many of LiU's strength and strategic areas. BME involves development of technologies such as biosensors, medical imaging, modelling, bioinformatics, health informatics, AI, eHealth, design, visualization, with many applications in Life Sciences, including e.g. circulatory and metabolic diseases, inflammation, neuro, and cancer. The workshop is held on Campus US and via Zoom, see <https://liu.se/en/research/bme-conference-2022>
- [16th MODPROD Workshop](#) on Model-Based “Model-based engineering” Cyber-physical Product Development for remote collaboration”, Linköping University, February 1-2, 2022. Chairpersons: Robert Braun (LiU/IEI) and Ingo Staack (LiU/IEI). Director: Niclas Fock. Vice Director: Peter Fritzson.
- Nikolaos Pappas is serving as IEEE SECON 2022 Workshops Co-Chair.
- The Workshop “Reflections on Propositional Proofs in Algorithms and Complexity” was held during the (online) FOCS conference in February 2022. The workshop, co-organized

by ELLIIT researcher Susanna de Rezende (LU, Computer Science LTH), had as aim to present some of the classical theory in proof complexity, as well as survey some of the recent exciting connections to other areas. Videos and slides of the talks are available at <https://derezende.github.io/focs21proofcomplexity/>

## Personnel

- Abdelazim Hussien started at LiU/IDA in November 2021 as a PhD student, to work on Cloud-based development of Cyber-Physical Systems (Project number: B08).
- Emil Björnson (Assoc. Prof., LiU/ISY) has left LiU and ELLIIT and was appointed Professor at the KTH Royal Institute of Technology in January 2022.
- Hedda Klintskog and Olivia Mattsson has completed their yearly employment as research assistants in the GANDER project and will be replaced by William Saranpää who starts in March.
- Konstantin Malysh started as a PhD student at LU/CS in October, in the ELLIIT project *B2B Data Sharing for Industry 4.0 Machine Learning*, jointly with LiU. Konstantin is also accepted as a WASP affiliated PhD student.
- Postdoc Ioannis Avgouleas has left the LiU ELLIIT project headed by Andrei Gurtov for Ericsson and is replaced by a new postdoc Gurjot Singh Gaba.
- Jing Yang left the ELLIIT environment on December 2021 to work for National Digital Switching System Engineering & Technological R&D Center, Zhengzhou, China.
- Johan Linåker, previously post-doc at LU/CS is now at RISE since Jan 1, 2022.
- Mr Mehrdad Salimnejad, started on January 2022 as a PhD student at LiU within an ELLIIT Project Call B, headed by Associate Professor Nikolaos Pappas.
- Navya Sivaraman started at LiU/Dept of Computer and Information Science (IDA) in October 2021 as an ELLIIT PhD student, to work on 5G/6G security.
- ELLIIT researcher Oscar Arrestam Silfergren is starting as an employee in Gunnar Cedersund's group at Linköping University, and will work on metabolic models in the Digital Twin.
- Rimalapudi Sarvendranath (LiU/ISY, postdoc with E.G. Larsson) has left and was appointed Assistant Professor at IIT Guwahati, India, in January 2022.
- Sam Thellman started as a postdoc in the ELLIIT project “Human Interaction with Autonomous Minibuses” (A22) in January 2022, after defending his PhD thesis on “Social Robots as Intentional Agents” in November 2021.
- Sehrish Qummar, new PhD student at IDA, Linköping University, since 15 March 2022, supervised by Christoph Kessler. Her future research will be part of the ELLIIT project GPAI (General-Purpose AI Computing), focusing on multi-domain (AI+X) programming models and optimized software synthesis for heterogeneous systems with reconfigurable AI accelerators.

- Suleyman Sadikhov (LU/EIT) är ny doktorand sedan 1:e februari. Han jobbar inom projektet "Information Handling in Industrial IoT", med Emma Fitzgerald som handledare.
- Valency Colaco started at LiU/Dept of Computer and Information Science (IDA) in January 2022 as a WASP PhD student, to work on AI security and safety.
- Zeyang Huang started at LiU/ITN in March 2022 as an ELLIIT-funded PhD student, supervised by Andreas Kerren (iVis Group at MIT). She will work on the visualization of dynamic multivariate networks and text data.

## Research Grants

- Andreas Kerren (LiU/ITN) has received a 2-years [WASP/DDLS Joint Research](#) grant for the project entitled "Visual Analytics for Enhancing Quality and Trust in Genome-wide Expression Clustering and Annotation". It will develop a new data-driven strategy (enabled by forming a multidisciplinary team spanning across the DDLS and WASP domains) for exploring whole-body co-expression patterns, using interpretable machine learning with the help of interactive visualization techniques, that support informed decisions, leading to better predictions and improved trustworthiness of the results. Two postdocs will be recruited to work together on this joint project that will be led by Andreas Kerren (LiU, WASP) and Mathias Uhlén (KTH, DDLS).
- Fredrik Lindsten (LiU/IDA) has received a WASP-DDLS Postdoc Twinning grant together with Prof Sebastian Westenhoff (UU) for the project *Novel AI methods for experimentally constrained protein structure prediction* (2022-2024).
- Fredrik Lindsten (LiU/IDA) is co-applicant on the cross-disciplinary Vinnova-funded project *AI Powered Carbon Border Adjustments*. The project is led by 2050 Consulting and involves researchers at the Centre for Climate Science and Policy Research at LiU (Tina-Simone Neset, Anna Ljung, and Björn-Ola Linnér) as well as the industrial partners Alfa Laval and Toyota Material Handling. Read more at: <https://2050.se/forskning-och-innovation/ai-powered-carbon-border-adjustments/>
- ELLIIT Faculty Jonas Unger (LiU/ITN), Fredrik Lindsten (LiU/IDA) and Michael Felsberg (LiU/ISY) have, together with Amy Loutfi (ÖRU), been granted a 5-year 20 MSEK WASP NEST project, *Multidimensional Alignment and Integration of the Physical and Virtual Worlds* (\_\_main\_\_). The aim of the project is to develop new methodology for systematic and symbiotic integration of machine learning with simulation-based model. External partners are: IKEA Communications, Arriver, the Swedish Traffic Administration, AI Sweden, and WASP WARA media and language. Read more at: <https://wasp-sweden.org/multi-dimensional-alignment-and-integration/>
- Nikolaos Pappas (LiU) has been awarded a 4-year VR project "Semantics-Empowered Communication for Networked Intelligent Systems", 3.8msek 2022-2025.
- Susanna de Rezende (LU, Computer Science LTH) received a 4 year 4 MSEK VR grant for her project "Efficient proofs and computations: a unifying approach".



## Courses, outreach

Christoph Kessler and August Ernstsson (IDA, LiU) held a tutorial on “Portable Programming of Heterogeneous Parallel Systems with SkePU” at the IEEE E-science-21 conference in September 2021. <https://www.escience2021.org/tutorials>

Emma Fitzgerald besökte KU Leuven i Ghent, Belgien för att ge en föreläsning om Mission Critical IoT inom en Erasmus-kurs: <https://iiw.kuleuven.be/english/ghent/euclides>

Gunnar Cedersund (LiU/IMT) var med i LiU-magasin som featured artikel: <https://secure.viewer.zmags.com/publication/f1f0d93c#/f1f0d93c/16>

Gunnar Cedersund (LiU/IMT) var också med i Radio P4 Östergötland den 22 mars kl 11.40-11.50: <https://sverigesradio.se/avsnitt/1905502> (Det börjar 36 minuter in på inslaget).

On March 8, Maria Kihl (LU/EIT) was invited to give a Science and Innovation Talk at Tetra Pak. The title of the presentation was “Industry 4.0 and Connectivity – Enabling technologies for sustainability”.

ELLIIT researchers at BTH have developed a new course covering empirical work for industry professionals in software engineering. In this course, software professionals get research training and are individually coached to conceive, design, and report a scientific study on a real-world problem.

Simin Nadjm-Tehrani presenterade vid i ett seminarium om cybersäkerhet och kritisk infrastruktur vid Lärardag för gymnasielärare vid ett virtuellt möte organiserad av LiU (7 oktober 2021).

Simin Nadjm-Tehrani agerade Domare vid Cyberchallenge en tävling för studenter som årligen organiseras av Försvarshögskolan (Feb 2022).

Tom Ziemke (LiU/IDA) gives a new PhD course “*Critical perspectives on AI*” during spring 2022.