ELLIIT
Excellence Center at Linköping - Lund in Information Technology

Nyhetsblad 22

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News and Research Highlights

ELLIIT Focus Periods Program Successfully Launched!

Data-driven modelling and learning for cancer immunotherapy. For 5 weeks (April 19 – May 20, 2022) in Lund, the first edition of the Focus Periods program gathered young international scholars, ELLIIT researchers and top international academics active in domains such as systems biology, cancer treatment, machine learning and dynamical systems.

During this period, the researchers worked together on jointly defined research topics. In addition to seminars and joint research challenges using unique data sets, a larger workshop with invited top-level scientists provided knowledge exchange and networking opportunities. The aim of the focus period was to forge new, long lasting, collaborations based on life science research that use and drive the development of novel machine learning techniques.

Hybrid AI – Where data-driven and model-based methods meet. Following the same format, during fall 2022 (October 18 – November 18, 2022), young international scholars, ELLIIT researchers and other well-established international academics gathered in Linköping to study techniques and methods for how to achieve Hybrid AI in two particular areas: A) Optimization for Learning and Learning for Optimization; and B) Statistical-Relational approaches to Planning, Control and Decision-making.

In connection with this focus period edition, there will be a topical collection hosted by the Springer journal Operations Research Forum. The main purpose of this topical collection is to encourage publications from interdisciplinary work initiated during the focus period, but other contributions addressing hybrid AI within the intersection between machine learning, optimisation and automatic control are also welcome.

ELLIIT Focus Periods 2023-2024

Do not miss the forthcoming focus periods!

Topic	Year	Organizers	Organization
Dynamics and Control of Complex Networks	Sept 4-Oct 6, 2023	Claudio Altafini, Emma Tegling, Giacomo Como, Ninna Stensgård, Tove Kvarnström	Linköping University, Lund University, Politecnico di Torino
6G – forming a better future	Oct 23-Nov 24, 2023	Maria Kihl, Ove Edfors, Fredrik Tufvesson, Erik G. Larsson, Elisabeth Ohlsson, Eva Westin	Lund University, Linköping University
Security and Fault Tolerance of Cyber-Physical Systems	Spring 2024	Martina Maggio, Mikael Asplund, Eva Westin	Lund University, Linköping University
Machine Learning for climate science	Autumn 2024	Fredrik Lindsten, Michael Felsberg, Natascha Kljun, Johan Lindström, Karin Baardsen, Tove Kvarnström	Linköping University, Lund University

Focus period "Network Dynamics and Control", Linkoping September 4th – October 6th, 2023

Claudio Altafini (LiU/ Department of Electrical Engineering)

The 2023 ELLIIT Focus period in Linköping will be dedicated to Network Science, in particular to dynamics and control of complex networks of interacting "agents". The organizers are Claudio Altafini (LiU), Emma Tegling (Lund), and Giacomo Como (Lund/Torino). The aim of the 5-week focus period is to stimulate the interaction between scientists working on network dynamics and control from different perspectives, representing the various fields in which networks and "network thinking" is of relevance, such as social sciences, economical sciences, biology, ecology, and engineering. We will host a number of young international scholars for an extended stay, and in the third week (Sept. 20-22) we will have a 3-day workshop with around 20 top-level speakers. Details of the program and participants are available at https://elliit.se/news-and-events/focus-period-linkoping-2023

Industry Collaboration is the Key to Success

During the industrial advisory board's day at Linköping university on June 2nd, 2022, some 20 people from the business and ELLIIT academic partners attended. The discussions included what businesses need and how ELLIIT can maximise benefit to industry and society in terms of what can be achieved in the research field. Read more about the meeting here.

ELLIIT Tech Talks

ELLIIT has recorded an ambitious seminar series on digitalization and societal challenges from an ICT perspective. All four ELLIIT campuses have been involved, and the topics are based on visions from the 2030 Technology Foresight. A detailed schedule of all themes and all videos can be found at the ELLIIT homepage and at ELLIIT´s YouTube channel.

ELLIIT Annual Workshop 2022, 19-20 October in Linköping

The ELLIIT annual workshop successfully took place at Linköping University. On October 19-20, 2022, around 200 participants from ELLIIT`s participating universities (LiU, LU, BTH and HH), industrial partners and invited guests could meet for scientific discussions and networking.

The workshop was spread over two days and comprised a broad mixture of interesting talks, mini-workshops, poster sessions, keynote addresses, and – not least – scientific discussions and social events for networking. A big thank you to the workshop organizers Fredrik Lindsten and Zheng Chen. Read more about the workshop here.

ELLIIT Annual Workshop 2023

The next ELLIIT workshop will be hosted by Lund University, starting at 10:00 on October 23rd and ending at 16:00 on October 24th. The workshop organizers are Richard Pates (Department of Automatic Control, LU) and Björn Landfeldt (Department of Electrical and Information Technology, LU). A preliminary program schedule will be available on the ELLIIT webpage.

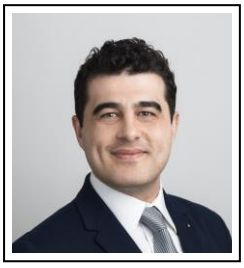
New ELLIIT Ph.D. Projects

The ELLIIT call D: Ph.D. student projects to run 2023-2027 was launched in May 2022. In the first step of the application process, 48 applications were received and 20 of these were invited to submit a detailed proposal in step 2. Step 2 process was closed in September 2022, and 11 successful applications were selected in November 2022. Following the same instructions for Call D, a call for proposals from Halmstad University was launched in November 2022. Eight applications were received, of which one will be funded.

Meet the new ELLIIT Recruited Faculty

Maria De Lauretis started as an Associated Lecturer at the School of Information Technology, Halmstad University, on August 1st, 2022. Maria received her Ph.D. from Luleå University of Technology in 2018 in Industrial Engineering. Her Ph.D. focused on transmission line theory and conducted emission problems in variable frequency drives. After one year at Atlas Copco as an EMC engineer, she started her postdoc at Luleå University technology in 2020, focusing on electromagnetic modeling for wide-bandgap transistors, in a VR-granted project and in collaboration with the ECH laboratory in Zurich. At Halmstad, her research focus is on electromagnetism and cyber security and, specifically, on side-channel attacks. She teaches Electronics design and Electromagnetic compatibility courses.

Henry Edison joined the Blekinge Institute of Technology as an associate senior lecturer in Software Engineering in August 2022. He received his Ph.D. in computer science from the Free University of Bozen-Bolzano, Italy. In 2018, he was awarded a prestigious Marie Curie Fellowship COFUND Programme of a two-year duration within Lero at the University of Galway, Ireland. His research interests include empirical software engineering in the area of software product innovation, software startups, agility and analytics in software engineering. In particular, his research examines current and future practices and trends of software development processes and tailors them to suit different contexts, from startups and new emerging to large and established organisations.



Onur Günlü has been an Assistant Professor at the Information Coding Division of the Department of Electrical Engineering, Linköping University since October 2022. He received the B.Sc. degree (Highest Distinction) in Electrical and Electronics Engineering from Bilkent University, Turkey in 2011; M.Sc. (Highest Distinction) and Dr.-Ing. (Ph.D. equivalent) degrees in Communications Engineering both from the Technical University of Munich (TUM), Germany in October 2013 and November 2018, respectively. Onur was a Research Group Leader at the TU Berlin and later at

the University of Siegen, Germany until September 2022. He has received the prestigious VDE Information Technology Society (ITG) 2021 Johann-Philipp-Reis Award, been selected as 2021 Exemplary Reviewer of the IEEE Transactions on Communications (TCOM) and received the 2023 ZENITH Research and Career Development Award. His research interests include information-theoretic privacy and security, coding theory, and statistical signal processing for future communication and computation systems.

Daniel Jung is an Associate Professor at the Department of Electrical Engineering at Linköping University. He received his Ph.D. in 2015 from Linköping University and did his postdoc, in 2017, at the Center for Automotive Research at The Ohio State University, OH, USA. Daniels research is mainly focused on fault diagnosis and prognostics of technical systems by combining models and data, but he is also working with optimization in different applications related to electrification of transportation. Currently, he is working with data-driven modeling of dynamic systems using physical insights for detection and isolation of unknown faults.

Yiannis Karayiannidis is an Associate Professor with the Dept. of Automatic Control, Faculty of Engineering at Lund University. He received a Diploma in Electrical and Computer Eng. (2004) and a Ph.D. degree in Electrical Eng. from Aristotle University of Thessaloniki, Greece (2009). He was affiliated with KTH, Royal Institute of Technology (2011-2020) and Chalmers University of Technology (2015-2022). He was PI for the CHROMA project funded by the Swedish Research Council (VR) and for the H2020 SARAFun project representing KTH and leading one of the core research WPs. He is currently a PI for the collaborative WASP project DARMA on Foundations of Deformable objects Manipulation. He is a WASP-affiliated faculty and supervisor for academic and industrial Ph.D. students funded by WASP and ELLIIT. His research interests include robot control, manipulation in human-centered environments, dual-arm manipulation, force control, robotic assembly, cooperative multi-agent robotic systems, physical human–robot interaction but also adaptive and nonlinear control systems.

Soheil Samii is a Senior Associate Professor at the Department of Computer and Information Science at Linköping University, where he obtained his Ph.D. (Computer Systems) in 2011. He conducts research broadly in the areas of cyber-physical and embedded systems, with particular focus on design and optimization of safety-critical applications. He is expanding this line of research towards the inclusion of cellular communication and edge/cloud computing as an integral part of cyber-physical systems. Soheil has extensive automotive industry experience, which he seeks to apply in his current and future research.

See all ELLIIT Recruited Faculty here: https://elliit.se/people/.

OpenModelica 1.20 release

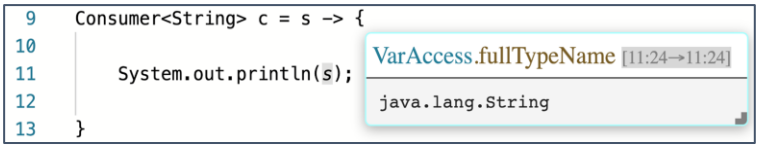
Peter Fritzson and Adrian Pop (LiU/ Department of Computer and Information Science).

OpenModelica is an open-source Modelica-based cyber-physical mathematical modeling and simulation environment intended for industrial and academic usage. A new release (1.20) was made on December 7, 2022. Release highlights include improvements such as automatic installation of the right Modelica Standard Library version, a new general purpose ODE solver, and improvements in the compiler, code generation, run-time, OMEdit, and FMI support.
See www.openmodelica.org for download.
See also https://trac.openmodelica.org/OpenModelica/wiki/ReleaseNotes/1.20.0 for the full release notes.

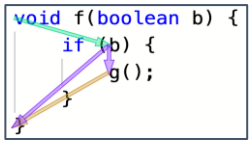
Interactive Static Analysis Exploration

Görel Hedin (LU/ Department of Computer Science)

ELLIIT PhD student Anton Risberg Alaküla (LTH/CS) has developed interactive cloud-based support for exploring and debugging static program analysis results directly in terms of source code. So called *property probes* are visual elements in a code editor that display analysis results of individual source code elements, for example, inferred types of expressions, control-flow edges of statements, and bytecode of methods. The probes are live – they are immediately updated as the code is edited. Some examples are shown below. The results were presented at the ACM SLE conference in New Zealand in December 2022, https://dl.acm.org/doi/abs/10.1145/3567512.3567525. The tool is now used in two advanced courses at LTH: EDAN65 Compilers and EDAP15 Program Analysis.



Probe showing inferred type of lambda parameter



Control-flow probe

Exploiting Sparse Structures in Source Localization and Tracking

Maria Juhlin (LU/ Centre for Mathematical Studies), Ph.D. thesis defended on November 25, 2022. Main supervisor: Prof. Andreas Jakobsson

This thesis deals with the modeling of structured signals under different sparsity constraints. Many phenomena exhibit an inherent structure that may be exploited when setting up models, examples include audio waves, radar, sonar, and image objects. These structures allow us to model, identify, and classify the processes, enabling parameter estimation for, e.g., identification, localisation, and tracking. In this work, such structures are exploited, with the goal to achieve efficient localisation and tracking of a structured source signal. Specifically, two scenarios are

considered. In papers A and B, the aim is to find a sparse subset of a structured signal such that the signal parameters and source locations may be estimated in an optimal way. For the sparse subset selection, a combinatorial optimization problem is approximately solved by means of convex relaxation, with the results of allowing for different types of a priori information to be incorporated in the optimization. In paper C, a sparse subset of data is provided, and a generative model is used to find the location of an unknown number of jammers in a wireless network, with the jammers' movement in the network being tracked as additional observations become available.

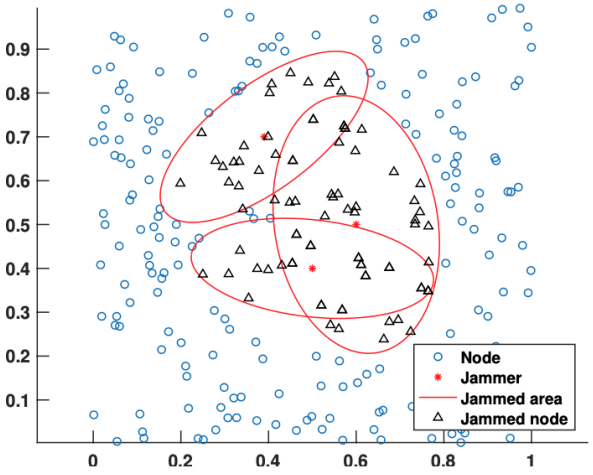


Figure 1: An example of a jamming scenario with overlapping jamming regions and elliptical jamming patterns. The unaffected nodes are represented by blue circles, and the jammed nodes are represented by black triangles.

Lars Nielsen participates in testing at Stanford

Lars Nielsen (LiU/ Department of Electrical Engineering)

Stanford has taken up algorithms for emergency avoidance developed within ELLIIT, specifically the concept of Wary Control developed by Victor Fors, Björn Olofsson and Lars Nielsen. The picture shows Lars Nielsen visiting Stanford and taking part in the experiments in September 2022.

Industry-academia collaboration for realism in software engineering research: Insights and recommendations

Per Runeson (LU/ Department of Computer Science)

PhD student Qunying Song at LU/CS has published a reflection on industry-academia collaboration: "Industry-academia collaboration for realism in software engineering research: Insights and recommendations" (https://doi.org/10.1016/j.infsof.2022.107135). It is recently published in Elsevier's Information and Software Technology. Song identifies five collaboration scenarios that can be used to help others achieve successful collaboration and avoid pitfalls. The scenarios are: 1) Enthusiastic shaping, 2) Mismatch of interests and authority, 3) Too close to business, 4) Detach from business, and 5) Talk rather than work.

Invited Talks

- Onur Günlü (LiU/ISY) held an invited talk on "Secure and Private Distributed Source Coding with Private Keys" at the *Chair* of Information Theory and Machine Learning of TU Dresden, Dresden, Germany in January 2023.
- Onur Günlü (LiU/ISY) will give an invited talk on "Secure Integrated Sensing and Communication" at the Division of Information Science and Engineering, KTH Royal Institute of Technology, Stockholm, Sweden in January 2023.
- Viktor Larsson, Lund University, will give an invited talk at the SIAM AG23 conference (July 10-14th 2023) held in Eindhoven, Netherlands. Title: Localization and Mapping from Images.
- Viktor Larsson, Lund University, gave an invited talk in the Learning Machines seminar series organized by RI.SE. (Video recording available here https://www.youtube.com/watch?v=5kH7FWBxpIk).
- Lars Nielsen, Vehicular Systems, ISY, LiU gave an invited plenary presentation at the main triannual conference in Advances in Automotive Control, Columbus, Ohio, Aug 28-Aug 31, 2022: "Force-centric perspectives on autonomous safety maneuvers." Lars Nielsen (2022). In: IFAC-PapersOnLine 55 (24), 1-6.
- Nikolaos Pappas IDA, LiU, "Semantics-aware Goal-Oriented Communications: AoI and beyond" Workshop on Semantics Communications, CentraleSupelec, Paris, France, October 2022.
- Nikolaos Pappas, IDA, LiU, "Security aspects for the age of information", Session on Security, Trustworthiness, and Resilience, ELLIIT Annual Workshop, Linköping, Sweden, October 2022.
- Nikolaos Pappas, IDA, LiU, "Semantics-aware Goal-Oriented Communications: AoI and beyond", Industrial forum on Semantic Communication, IEEE World Forum on the Internet of Things – WFIoT2022, Japan, November 2022.
- Nikolaos Pappas, IDA, LiU, "Semantics-aware Goal-Oriented Communications: AoI and beyond" IEEE Tactile Internet Webinar, January 2023.

- Emma Söderberg was invited to give a keynote at the 33rd Annual Meeting of the Psychology of Programming Interest Group (PPIG) in Sep 2022.
- Johan Thunberg gave a keynote presentation about "An Optimization Problem for Consensus, Multi-Matching and Clustering" at the workshop "Quantum leap and mathematics" in Oslo, organized by the Oslo Metropolitan University.
- Tom Ziemke gave an invited talk on *"Mental State Attribution in Social Robotics"* at the workshop on *"Behavior Adaptation and Learning for Assistive Robotics"* (BAILAR), held in conjunction with the *31st International Conference on Robots & Human Interactive Communication* (ROMAN 2022), held in Naples, Italy, in August/September.
- Tom Ziemke gave an invited lecture on *"Autopoiesis"* as part of the *"Core Enaction"* lecture series organized by *Mind & Life Europe* (https://www.mindandlife-europe.org/our-work/core-enaction-series/).

Awards and Appointments

- Krzysztof Bartoszek has been promoted to Senior associate professor in Statistics at IDA, LiU.
- The work "Information Freshness and Packet Drop Rate Interplay in a Two-User Multi-Access Channel" by Emmanouil Fountoulakis, Themistoklis Charalambous, Nikolaos Nomikos, Anthony Ephremides, and Nikolaos Pappas has been selected for the Best Student Conference Paper Award in Swe-CTW 2022.
- The work "Age of Information Performance of Multiaccess Strategies with Packet Management" by Antzela Kosta, Nikolaos Pappas, Anthony Ephremides, and Vangelis Angelakis, has been selected for the 2022 IEEE/KICS Journal of Communications and Networks (JCN) Best Paper Award.
- Muhammad Laiq, PhD student at BTH/ Department of Software Engineering (with co-authors Nauman bin Ali/ BTH, Jürgen Börstler/ BTH, Emelie Engström/ LU), received a Best poster presentation at PROFES 2022 for the paper "Early identification of invalid bug reports in industrial settings – a case study."
- Nikolaos Pappas, IDA, LiU, was appointed Secretary for the IEEE Tactile Internet Technical Committee.
- E. G. Larsson Highly cited according to ISI Web of Science, 2022.
- Johan Thunberg was appointed Docent in Applied Mathematics at Halmstad University in January 2023.

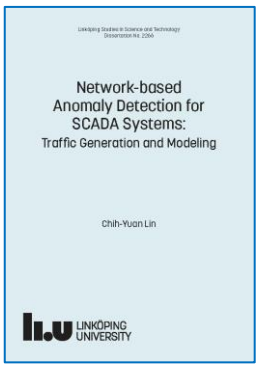
Program Chairs and Editorships

- Zheng Chen served as Technical Program Chair for 2022 IEEE-SPS and EURASIP summer school on Defining 6G: Theory, Applications, and Enabling Technologies.
- Zheng Chen served as workshop co-chair for 2022 IEEE GLOBECOM workshop on Wireless Communications for Distributed Intelligence.
- Zheng Chen has become an Editor at "IEEE Transactions on Green Communications and Networking".
- Luke Church was the academic chair of the 33rd Annual Meeting of the Psychology of Programming Interest Group (PPIG) in Milton Keynes, Sep 2022.
- Michael Felsberg, LiU/ISY, serves as area chair for CVPR 2023, to be held in Vancouver, Canada, in June 2023.
- Michael Felsberg, LiU/ISY, serves as program chair for SCIA 2023, to be held in Levi, Finland, in April 2023.
- The Center for Model-based Cyber-Physical Product Development (MODPROD, Vice Director Prof. Peter Fritzson, LiU/IDA) arranges the 17th MODPROD Workshop on February 7-8, 2023, at Linköping University. The theme for this year is "Trusting the models for complex systems". See https://modprodblog.wordpress.com for details and call for participation.
- The Open Source Modelica Consortium, Vice Director Prof. Peter Fritzson, Technical Coordinator Adrian Pop (LIU/IDA) arranges the 15th OpenModelica Annual Workshop, February 6, 2023, on OpenModelica technology for Modelica and FMI including applications. See https://modprodblog.wordpress.com for details and call for participation.
- Onur Günlü (LiU/ISY) has served as a Guest Editor, together with Rafael F. Schaefer (TU Dresden), Holger Boche (TU Munich), and H. Vincent Poor (Princeton), for Entropy Special Issue on "Information Theoretic Methods for Future Communication Systems" (2021-2023).
- Onur Günlü (LiU/ISY) has been serving as an Associate Editor for EURASIP Journal on Wireless Communications and Networking (2021-2024).
- Onur Günlü (LiU/ISY) will serve as a Main Symposium Co-Chair at the IEEE Communications Society's flagship conference 2023 IEEE Global Communications (GlobeCom) for the Communication and Information System Security (CISS) symposium that will take place in Kuala Lumpur, Malaysia in December 2023.
- Görel Hedin (LTH/CS), served as chair for the 2022 AITO Dahl-Nygaard Award Committee, an annual prize in the name of Ole-Johan Dahl and Kristen Nygaard to honor their pioneering work on object-orientation.
- Andreas Kerren (LiU/ITN) serves as a co-editor of a special issue on "Visual Text Analytics" of the Information Visualization Journal in 2023.
- Andreas Kerren (LiU/ITN) served as a member of the EuroVis Best Short Paper Award Committee in 2022.

- Simin Nadjm-Tehrani, LiU/Dept of Computer and Information Science, served as program chair for the European Dependable Computing Conference (EDCC) 2022, in Saragoza, Spain in September 2022.
- Simin Nadjm-Tehrani, LiU/Dept of Computer and Information Science, acted as associate editor for the international journal IEEE Transactions of Dependable and Secure Systems (TDSC).
- Nikolaos Pappas, IDA, LiU, Area Editor for the Wireless Networks at the IEEE Open Journal of Communications Society.
- Nikolaos Pappas IDA, LiU, joined the editorial board of the IEEE Transactions on Machine Learning in Communications and Networking.
- Nikolaos Pappas, IDA, LiU, is a Guest Editor of the IEEE Network Special Issue on "Tactile Internet for a Cyber-Physical Continuum".
- Nikolaos Pappas, IDA, LiU, is a Guest Editor of the IEEE Internet of Things Magazine Special Issue on "Task- Oriented Communications and Networking for the Internet of Things (IoT)".
- Nikolaos Pappas, IDA, LiU, is a Guest Editor of the Entropy Special Issue on "Foundations of Goal-Oriented Semantic Communication in Intelligent Networks".
- Tom Ziemke served as program co-chair for the conference CogSIMA 2022, the IEEE Conference on Cognitive and Computational Aspects of Situation Management, held in Sorrento, Italy, in June 2022 (https://edas.info/web/cogsima2022/committees.html).

PhD and Licentiate Theses

- Ema Becirovic (LiU) successfully defended her Ph.D. thesis "Signal Processing Aspects of Massive MIMO" on October 14, 2022. Advisor: E. G. Larsson at LiU.
- Maria Juhlin (LU) successfully defended her Ph.D. thesis "Exploiting Sparse Structures in Source Localization and Tracking" on November 25, 2022. Main supervisor: Andreas Jakobsson.
- Chih-Yuan Lin defended her Ph.D: thesis "Network-based Anomaly Detection for SCADA systems: Traffic generation and Modeling", Linköping University" on 19th December 2022. Brief description: Modern Supervisory Control and Data Acquisition (SCADA) systems are increasingly adopting open standards and being connected to the Internet to enable remote control. A boost in sophisticated attacks against SCADA systems makes SCADA security a pressing issue. This thesis proposes anomaly detection methods based on timing of packets in a flow and flow correlations as a security countermeasure.



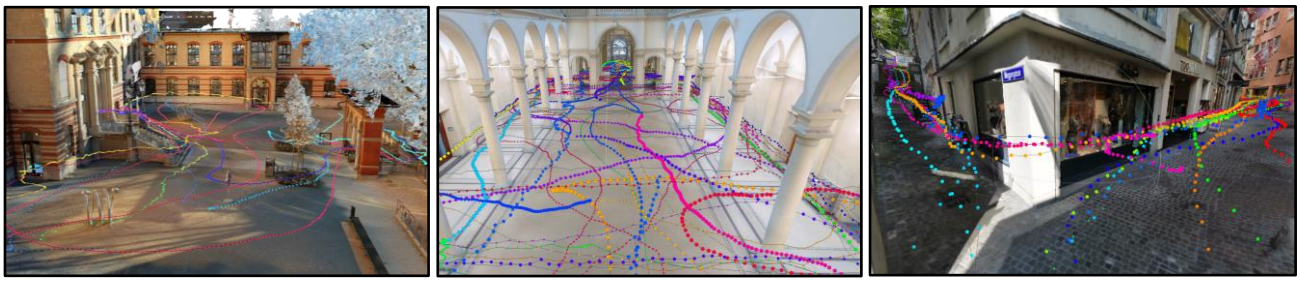
- Nasir Mehmood Minhas, "Understanding and improving regression testing practice", PhD thesis, BTH/ Department of Software Engineering, October 2022. See http://urn.kb.se/resolve?urn=urn:nbn:se:bth-23634 for details.

- John Tinnerholm, LIU, IDA, with main supervisor Adrian Pop, successfully defended his licentiate thesis "A Composable and Extensible Environment for Equation-based Modeling and Simulation of Variable Structured Systems in Modelica" on June 10, 2022.
- Vi Tran, "Understanding Test-Artifact Quality in Software Engineering", Licentiate thesis, BTH/ Department of Software Engineering, June 2022.
  See http://urn.kb.se/resolve?urn=urn:nbn:se:bth-22819 for details.
- Muhammad Umar Farooq (LU/EIT) successfully defended his PhD thesis with the title "Sparse Codes on Graphs with Convolutional Code Constraints" in November 2022. The main supervisor is Michael Lentmaier and the co-supervisor is Ove Edfors.

Organized Conferences and Workshops

- Per-Erik Forssén, Amanda Berg, Mårten Wadenbäck, Anders Eklund, Jonas Unger, and Gabriel Eilertsen, at Linköping University, are organizing the Swedish Symposium on image analysis and the Swedish Symposium on Deep Learning on March 13-15, 2023. The conference will take place at Kolmårdens Vildmarkshotell. Here is a link to the conference website: https://ssba.org.se/ssba2023/.
- Hardly has 5G become a reality, when the question of what 6G will be like is asked? That was the starting point when the 2022 IEEE SPS – EURASIP Summer School on Defining 6G was held at Linköping University, Sweden, in August 29-September 1, 2022. It was packed to the last seat when 119 people from 20 countries gathered around the theme "Defining 6G: Theory, Applications, and Enabling Technologies". Erik G. Larsson, LiU, and Petar Popovski, Aalborg University, Denmark were general co-chairs. Zheng Chen, LiU. was technical program chair. Nikolaos Pappas, LiU, was keynote chair. Matti Latva-Aho, University of Oulu, Finland, was industry chair.

- Andreas Kerren (LiU/ITN) co-organized the Dagstuhl Seminar 22191 “Visual Text Analytics” in May 2022. The seminar coalesced an international community of experts from different disciplines around a research roadmap for the next 5–10 years, as documented through working group reports. The seminar generated a series of research questions which serve as a call to action to the wider community.
- A mini-workshop, entitled “Data Collection, Processing, and (Visual) Analytics”, was held at the ELLIIT Annual Workshop 2022 in Linköping and organized by Kostiantyn Kucher and Andreas Kerren (LiU/ITN).
- The tutorial “Benchmarking Localization and Mapping for Augmented Reality” was co-organized by Viktor Larsson, Lund University, at the European Conference on Computer Vision 2022, held in Tel Aviv, Israel. The tutorial covered the task of large-scale localization and mapping for Augmented Reality (AR). The tutorial consisted of an overview of the current state-of-the-art methods and benchmarking datasets, as well as introducing a dataset (LaMAR). The new dataset contains three large scenes captured multiple times over a period of more than a year with both AR devices (HoloLens2 and iPhone/iPad) and 3D laser scanners. More details on both the tutorial and the dataset can be found here https://lamar.ethz.ch/tutorial-eccv2022/



- Nikolaos Pappas IDA, LiU is chairing/cochairing the:
  - IEEE ICASSP 2023 Workshop on Timely and Private Machine Learning over Networks.
  - IEEE WoWMoM 2023 Workshop on Extended Reality over 5G New Radio and Beyond (XRNR).
  - IEEE ICC 2023 Workshop on Beyond URLLC: Research Trends and Open Challenges in Real-Time IoT toward 6G (BUW-6G).
  - IEEE Future Networks World Forum 2022 Workshop on Incorporating Physical Layer Security in 6G Security Protocols.
- Emma Söderberg and Luke Church are general chairs for <Programming>'24 which will be held in Lund 2024.
- Emma Söderberg and Luke Church are general chairs of the 34th Annual Meeting of the Psychology of Programming Interest Group (PPIG) in Aug/Sep 2023 which will be held in Lund.
- Emma Söderberg joined the steering committee of the the <Programming> conference and the editorial board of the Programming Journal.

Personnel

- Two new postdocs from Ulm University (Germany), Franziska Babel and Philipp Höck, will join Tom Ziemke's Cognition & Interaction Lab at LiU in April 2023 to work on human-robot and human-vehicle interaction, partly funded by ELLIIT project A22, "Human Interaction with Autonomous Minibuses", as well as a new VR-NT grant on "Social Cognition in Human-Robot Interaction".
- Moa Björkman and Joel Engström are joining the ELLIIT environment as research assistants for the coming year within the SSF/VR-funded ADAPT project (PI: Emma Söderberg) where they will work on prototypes for adaptive developer tools.
- Carmela Bernardo started as a postdoc at ISY, LiU, working on the ELLIIT project "Dynamics and control of data-driven networks" coordinated by Claudio Altafini.
- Lena Buffoni has got a position as Associate Professor (universitetslektor) at Dept. Computer and Information Science, Linköping University, starting July 15, 2022.
- August Ernstsson, who received his PhD in Computer Science at IDA, Linköping University, in 2022 and currently works as a postdoc at PELAB, IDA, Linköping University, joined the ELLIIT GPAI project as associated researcher, where he contributes to developing high-level abstractions for DNN computations within his open-source high-level programming framework SkePU (https://skepu.github.io) for heterogeneous computer systems. August will also work as a guest researcher during 2023 at the University of Münster, Germany.

- Johan Heander has joined the ELLIIT environment as a Ph.D. student, funded by WASP, with supervision from Emma Söderberg (Dept. of Computer Science, LU), Christofer Rydenfält (Dept. of Design Science, LU), and Martin Höst (Dept. of Computer Science, LU). The project is called "DAPPER: Seamless, Tailored Code Review" and is focused on user-centric code review tooling for software development.
- During 2022, ELLIIT researcher Andreas Jakobsson held a visiting professorship at Harbin Engineering University, China.
- Luca Lebon started as a PhD student at ISY, LiU, in October 2022. He will work on the ELLIIT project "Dynamics of Complex Socio-Technological Network Systems" under the supervision of Claudio Altafini.
- Saba Marandi will start as a PhD Student in the Information Theory and Security (ITS) Group of LiU/ISY/ICG in March 2023. She will work on "Information- and Coding-Theoretic Security".
- Postdoc Taqwa Saeed is leaving the ending HH/LU ELLIIT project headed by Alexey Vinel/Johan Thunberg. She will start as a postdoc at the Design Sciences department at Lund University and do research on tactile display technologies for the visually impaired.
- William Saranpää och Felix Apell Skjutar are continuing another year as research assistants working on the prototype from the GANDER project focused on eye-tracking assisted code review.

- Muhammad Umar Farooq has left LU/EIT and ELLIIT after completing his PhD and started at Ericsson in Lund in January 2023.
- Alexey Vinel has become a Professor at KIT, Germany.
- The Computer Vision Laboratory at Linköping University has a new PhD student: Ziliang Xiong. Ziliang has been working in the call C project "Situation Aware Perception for Safe Autonomous Robotics Systems" since September 2022.

Research Grants

- Zheng Chen (Assistant Professor at ISY, LiU) received a starting grant from Swedish Research Council (VR), for her project on "Next-generation communication design for distributed intelligence over wireless networks". The project has total budget SEK 4 million for a duration of 4 years.
- Zheng Chen has been granted a WASP academic PhD student project.
- Håkan Grahn (BTH/CS) received a recruitment grant (2.6MSEK, 2023-2027) from the Knowledge Foundation, to partly fund the recruitment of a new senior lecturer in AI/ML to the research team.
- Onur Günlü (LiU/ISY) has received a 5-year 3MSEK ZENITH Research and Career Development Grant for his project "Quality of Security Service (QoSS) Guarantees for Intelligent Internet-of-Things (IoT) Devices". Collaboration partner is Sectra Communications (2023-2027).
- Christoph Kessler is PI of the new 30Mkr, 5-year SSF project "Adaptive Software for the Heterogeneous Edge-Cloud Continuum (ASTECC)" at IDA, Linköping University, which started in December 2022. Co-PIs are Mikael Asplund (IDA), Niklas Carlsson (IDA), Zebo Peng (IDA) and Soheil Samii (IDA). The project investigates methods for the design, automated orchestration and dynamic adaptation of software to enable its autonomous, efficient and secure execution in dynamic, heterogeneous, distributed device-edge-cloud environments, i.e., in multi-provider, multi-service, and multi-criteria scenarios, without relying on a global resource manager. The new techniques developed will be evaluated in four different use cases in strategic domains for Swedish industry with software-intensive products: Computer networks and applications they enable; smart energy grids; aviation; and automotive. A short description of the project can be found here at the project web page.
- Erik G. Larsson was awarded new project funded by the KAW foundation.
- ELLIIT Call D, Viktor Larsson, Lund University. Project title: Revisiting data associations in large-scale mapping. In collaboration with Mårten Wadenbäck (LiU) and Michael Felsberg (LiU).
- H2020-SNS-6GTandem starts in January 2023. Partners include LiU (E. G. Larsson) and LU (O. Edfors, and others)

- Andreas Kerren (LiU/ITN) has received a 5-years ELLIIT Call-D grant (5 MSEK in total) for the project entitled "Visual Analytics of Large and Complex Multilayer Technological Networks" together with Richard Pates (LU/Automatic Control). Multilayer networks are a new way to model complex real-world systems that demand novel and efficient solutions for their analysis. This project will study and develop novel visual analytics approaches for the exploration and analysis of multilayer technological networks, which is not only highly relevant for the field of visual analytics, but also for the energy efficiency of power systems. One Ph.D. student will be recruited to work on this interdisciplinary project.
- As co-applicant, Andreas Kerren (LiU/ITN) has received a 2-years research grant (about 2 MSEK) from the Norrköping Fund for the project entitled "Immersive Analytics for Urban Heat: from Visual Exploration to Decision Support in Norrköping Municipality. Katerina Vrotsou (LiU/ITN) is PI of this project that is concerned with researching immersive environments for the visualization and exploration of the appearance and effect of (extreme) weather events in urban areas with a focus on mapping and understanding the occurrence of urban heat in Norrköping municipality. Several partners are involved coming from several institutions: LiU, SMHI, Norrköping Municipality, and Linnaeus University. A postdoc researcher has already been hired to work on this project.
- Nikolaos Pappas, IDA, LiU is the LiU PI for the "ETHER - sElf-evolving terrestrial/non-Terrestrial Hybrid nEtwoRks", HORIZON-JU-SNS-2022-STREAM-B-01-03 — Communication Infrastructure Technologies and Devices. In this 3-year project we will investigate data analytics and semantics-aware caching for high energy efficiency, in which we will develop semantics-aware information handling algorithms that generate and transmit only a small fraction of data without affecting the conveyed information and combine it with edge computing and caching for further latency reduction and energy efficiency gains. There are 13 partners from EU.
- Tom Ziemke received a 2,8 million SEK project grant from the Swedish Research Council (VR, NT) for a three-year project on "Social Cognition in Human-Robot Interaction". This builds on work in ELLIIT project A22, Human Interaction with Autonomous Minibuses, among other projects.
- Tom Ziemke is a participating researcher in two new project grants on using social robots to stimulate school kids to read: one from the Swedish Research Council (HS), coordinated by Mattias Arvola (IDA, LiU), and one from Norrköpingsfonden, coordinated by Susanne Severinsson (IBL, LiU).

New Courses

- Claudio Altafini gave a PhD course on "Opinion Dynamics on Social Network" at LiU in the fall 2022.
- At STIMA LiU, Krzysztof Bartoszek and colleagues are organizing Stochastic differential equations with R school 21-24 March 2023. The lectures will be done by the YUIMA team

(https://yuimaproject.com/) who are responsible for developing the YUIMA R package for stochastic differential equations. Students can take the school as a course worth 3hp.

- In March 2023, Christoph Kessler is offering the biennial, graduate-level course "Advanced Compiler Construction" (6hp) at IDA, Linköping University, with a focus on intermediate program representations, static program analysis, program optimization and code generation, including compilation techniques for parallel and embedded systems, thus of interest e.g. to ELLIIT projects with a focus on programmable hardware design, DSL design and implementation, and performance-critical applications, such as GPAI (General-Purpose AI Computing). The lecture/lessons part of the course will be held in block format 7-17 March. It is also open to external participants, and lectures and lessons will be transmitted via zoom. For the course schedule and details, see https://www.ida.liu.se/~chrke55/courses/ACC/
- Nikolaos Pappas, IDA, LiU will give a PhD course on "Age of Information: Foundations and Applications" during Spring 2023.
- Tom Ziemke gave a new PhD Course "Critical Perspectives on AI" in 2022, which will also run autumn 2023 (on Zoom).

Outreach Activities

- Onur Günlü (LiU/ISY) will serve for the third year as a member of the IEEE Information Theory Society (ITSoc) Student and Outreach Subcommittee (2021-2023).
- Onur Günlü (LiU/ISY) will serve for the first year as a member of the IEEE Information Theory Society (ITSoc) Diversity and Inclusion Committee (2023-2024).
- Andreas Kerren (LiU/ITN) continues to serve as node coordinator (at Linnaeus University) in InfraVis, the new national research infrastructure funded by the Swedish Research Council (Vetenskapsrådet) which supports scientific advancement through the application of state-of-the-art data analysis and visualization techniques.
- LiU/IDA/Simin Nadjm-Tehrani participated in a radio program "Gräns" discussing the cybersecurity attack consequences on the electricity networks.
- LiU/IDA/Simin Nadjm-Tehrani participated in preparing a report on cybersecurity consequences for the competitiveness of industry in Sweden, prepared by IVA, and presented at an outreach session in the Swedish Parliament members lunch club with a discussion on the topic. The report "Cybersäkerhet för ökad konkurrenskraft" can be accessed here.
- Nikolaos Pappas, IDA, LiU, gave/will give the following tutorials in:
  - IEEE/CIC ICCC 2022: Age of Information Optimizations in Wireless Networks: Theories, Applications, and Beyond.
  - IEEE SPS - EURASIP summer school on "Defining 6G: Theory, Applications, and Enabling Technologies", Goal-oriented and semantic communications.
  - IEEE VTC-Fall 2022: Age of Information: Bytes, Money, and Semantics.

- NCC 2023: Semantics-aware Goal-Oriented Communications: Age of Information and beyond.
- IEEE WCNC 2023: Task-oriented communications and networks.
- IEEE ICC 2023: Task-oriented and Semantic-aware Communications and Networking for 6G.

- Tom Ziemke gave two popular-scientific lectures on the public perception of AI and its limitations as part LiU's popular-science week in October 2022 (https://liu.se/artikel/popularvetenskapliga-veckan) as well as the Swedish Air Force Museum's theme day on "Tomorrow's Technology" in January 2023.