

## ELLIIT Nyhetsblad 2 – December 2012

Redaktör: Karl-Erik Årzén

Målet med ELLIITs bi-monthly nyhetsblad är att sprida information om händelser och nyheter från ELLIIT. Nyhetsbladet är skrivet på en blandning av svenska och engelska.

### Nyheter

#### **Constraint Programming Competition:**

Recently, JaCoP, the constraint programming solver from Krzysztof Kuchcinski's group at LU/CS got the "silver medal" in the solver competition "MiniZinc Challenge 2012" in category of fixed search, that is when the search is specified explicitly in the model. The "bronze medal" went to Google's OR-Tools ;) and 4th place to another Java solver from France, choco.

#### **Workshops at CPSWEEK:**

ELLIIT members are involved in the organization of several workshops at the CPSWEEK in Philadelphia.

- Walid Taha, HH, is organizing the Third ACM/IEEE Workshop on Design, Modeling and Evaluation of Cyber Physical Systems (CyPhy) to be held as part of the CPSWeek in Philadelphia on April 8th. The deadline for submissions is February 1st, 2013. More information about the workshop can be found at <http://cyphy.org>
- Martina Maggio, LU/RT, is program chair for the 5<sup>th</sup> Workshop on Adaptive and Reconfigurable Embedded Systems (APRES 2013) to be held in conjunction with the CPSWEEK. See <http://www.control.lth.se/APRES2013/> for more details and deadlines.
- Enrico Bini, LU/RT, is organizing a Workshop on Control, Computation and Communication (COCOCO) for CPSWEEK.

#### **Some top publications:**

Two papers in IEEE Transactions on Software Engineering during 2012:

- B. A. Kitchenham, D. I. K. Sjøberg, T. Dybå, P. Brereton, D. Budgen, M. Höst, and P. Runeson. Trends in the quality of human-intensive software engineering experiments – a quasi-experiment. IEEE Transactions on Software Engineering, Preprint, 2012. <http://doi.ieeecomputersociety.org/10.1109/TSE.2012.76>
- Grbac, T. G., P. Runeson, and D. Huljenic. A Second Replicated Quantitative Analysis of Fault Distributions in Complex Software Systems. IEEE Transactions on Software Engineering, Preprint, 2012. <http://doi.ieeecomputersociety.org/10.1109/TSE.2012.46>
- P. Stankovski, M. Hell, T. Johansson: [An Efficient State Recovery Attack on the X-FCSR Family of Stream Ciphers](#), Journal of Cryptology, 2012.

- M. Hell, T. Johansson, L. Brynielsson, H. Englund: [Improved Distinguishers on Stream Ciphers with Certain Weak Feedback Polynomials](#), IEEE Transactions on Information Theory, Vol. 58, No. 9, pp. 6183-6193, 2012.
- Richard Berntsson-Svensson, Tony Gorschek, Björn Regnell, Richard Torkar, Ali Shahrokni, Robert Feldt: [Quality Requirements in Industrial Practice - An Extended Interview Study at Eleven Companies](#). IEEE Transactions on Software Engineering, 38(4): 923-935 (2012)
- Michael Unterkalmsteiner, Tony Gorschek, A. K. M. Moinul Islam, Chow Kian Cheng, Rahadian Bayu Permadi, Robert Feldt: [Evaluation and Measurement of Software Process Improvement - A Systematic Literature Review](#). IEEE Transactions on Software Engineering, 38(2): 398-424 (2012)

#### Top citation:

Per Runeson's and Höst's EMSE paper on case study methodology has highest citation rate ever according to ISI (16,5 citations/year), and second most cited in EMSE.

<http://dx.doi.org/10.1007/s10664-008-9102-8>

#### Awards:

- Rolf Johansson, LU/RT, has been elected Fellow of the IEEE for his contributions to system identification and adaptive control.
- Karl-Erik Årzén, LU/RT, has been inducted into the Royal Swedish Academy of Engineering Sciences (IVA).
- Best Automation Paper Award from the 2012 IEEE International Conference on Robotics and Automation (ICRA2012), Saint Paul, MN, May 14-18, 2012, presented on 17 May 2012:
  - A. Stolt, M. Linderöth, A. Robertsson, R. Johansson, Force Controlled Robotic Assembly without a Force Sensor, 2012 IEEE International Conference on Robotics and Automation (ICRA2012), Saint Paul, MN, May 14-18, 2012, pp.1538-1543.
- Alexander Kleiner's project "A Mapping Module for All-Terrain Robots used by First Responders in Critical Domains" has been selected as Finalist of the EU Robotics Technology Transfer Award 2012.
- Mirsad Cirkic at LiU/ISY/communication systems wins best poster award at Swe-CTW 2012

#### Industrial seminar in Karlskrona:

On November 14, an industrial seminar related to ELLIIT Project 4.1, and initiated by researchers from this project, was held in Karlskrona. The title of the seminar was: [Going Agile, Global, Innovative and into the Cloud](#). The seminar started with three presentations from industrial collaborative partners (ABB, Ericsson and Massive - A Ubisoft Studio), and in the afternoon three parallel workshop tracks were held on agile software development, innovation and value, and cloud computing respectively.

#### Keynote presentation at Ericsson Rational User Conference:

Dr. Kai Petersen, working as a post doc in ELLIIT, gave a keynote presentation at the Ericsson Rational

User Conference (ERUC) with the title *Software Development for System of Systems: Detecting Bottlenecks and Understanding their Reasons*. 280 people attended the conference.

**Some new dissertations:**

- Martin Ågren: [On Some Symmetric Lightweight Cryptographic Designs](#), Nov 2012
- Krzysztof Wnuk: [Visualizing, Analyzing and Managing the Scope of Software Releases in Large-Scale Requirements Engineering](#), Oct 2012
- Hien Q. Ngo at LiU/ISY/Communication Systems defended his licentiate thesis on the efficiency of large-scale MIMO on Dec. 14, 2012  
<http://www.commsys.isy.liu.se/en/staff/nghien>
- Toivo Henningson, LU/RT, PhD thesis "Stochastic Event-Based Control and Estimation", Dec 19, 2012
- Andreas Stolt, LU/RT, Lic thesis, "Robotic Assembly and Contact Force Control", Dec 21, 2012

**LUCAS day: Industry-academia collaboration:**

The annual LUCAS day (Lund University Center for Applied Software) was held in Lund on October 24. The objective is to inspire and develop collaboration between industry and academia in the field of applied software research. This year, there were invited talks on outsourcing, as well as presentations and short interactive workshops related to ongoing research projects, many involving ELLiit researchers.

**777 visited EUrobotics Week in Lund, Sweden**

As part of the European robotics week November/December 2012 the RobotLab at LTH, Lund University, robotics researchers gave presentations and guided tours in the RobotLab. A total of 777 primary and secondary school children plus adults 20 to 85 years participated. The goal was to raise awareness of and interest in science and engineering in general and robotics in particular.

The arrangement showed, among other things:

- \* Ball-catching robot using stereo vision
- \* Robot doing free-form hot-wire cutting in styrofoam
- \* Dual-arm robot motion imitating humans using the kinect-sensor
- \* Contact-force controlled parallel kinematic manipulators
- \* Simultaneous localization and mapping for mobile robots
- \* From CAD/CAM to robot milling
- \* Tactile/haptic feedback for operator interface
- \* The ball and beam - a classical demo of feedback control
- \* Overview of current and outlook of future robotics research
- \* Laser-based surface scanning for robot path planning

Youtube video from the event: <http://www.youtube.com/watch?v=sZf-HQB8bGc>

Visitor statements

*"I would like to study here when I grow up, because I like technology and robots and stuff."*

/Jonas Bengtsson, Year 4 in primary school

*"I would like to make a ball-catching machine for practicing badminton."*

/Stella Wallberg, Year 4 in primary school

*"It means a lot to the children to visit this type of environment. In school it's all very theoretical as we can only show them pictures. It's a great experience for everyone."*

/Annukka Haavisto, Teacher primary school year 4 at Tunaskolan, Lund

Read more

<http://www.eurobotics-project.eu/press-room/eurobotics-press-releases/the-second-european-robotics-week-a-tremendous-success.html>

[http://www.lth.se/programvaruportalen/kalendarium/2012\\_11\\_28\\_30\\_eurobotics\\_week\\_2012/](http://www.lth.se/programvaruportalen/kalendarium/2012_11_28_30_eurobotics_week_2012/)

#### **Lund-Linköping visibility at the Modelica Conference:**

The [9th International Modelica Conference](#) was held on Sept 3-5 in Munich, where Elliit researchers contributed with several articles. One of the hot topics was the new Functional Mock-up Interface standard (FMI) for model exchange and tool coupling. Elliit researchers from Lund and Linköping have made important contributions to this standard. As an input to the FMI development, one article compared the generation of Jacobians for the two open-source Modelica systems [OpenModelica](#) from Linköping and [JModelica.org](#) from Lund. Other topics included debugging and parallelization. For more details, see, for example:

- Torsten Blochwitz, Martin Otter, Johan Åkesson, Martin Arnold, Christoph Clauss, Hilding Elmqvist, Markus Friedrich, Andreas Junghanns, Jakob Mauss, Dietmar Neumerkel, Hans Olsson, Antoine Viel: [Functional Mockup Interface 2.0: The Standard for Tool independent Exchange of Simulation Models](#). In 9th International Modelica Conference, Munich, Germany, September 2012.
- Johan Åkesson, Willi Braun, Petter Lindholm, Bernhard Bachmann: [Generation of Sparse Jacobians for the Function Mock-Up Interface 2.0](#). In 9th International Modelica Conference, Munich, Germany, September 2012.
- Adrian Pop, Martin Sjölund, Adeel Asghar, Peter Fritzson, Francesco Casella. Static and Dynamic Debugging of Modelica Models. In Proceedings of the 9th International Modelica Conference (Modelica'2012), Munich, Germany, Sept.3-5, 2012. ([proceedings](#))
- Mahder Gebremedhin, Afshin Hemmati Moghadam, Peter Fritzson, Kristian Stavåker. A Data-Parallel Algorithmic Modelica Extension for Efficient Execution on Multi-Core Platforms. In

Proceedings of the 9th International Modelica Conference (Modelica'2012), Munich, Germany, Sept.3-5, 2012. ([proceedings](#))

### **Halmstad Colloquium Schedule:**

The Halmstad Colloquium is a distinguished speaker series hosted by the School of Information Science and Computer & Electrical Engineering at Halmstad University. The speakers are invited from universities around the world to talk about topics in the areas of embedded and intelligent systems, cyber physical systems, and related areas. Talks typically take place in the middle of the month.

The colloquium is an activity of two centers for industrially-motivated, long-term research: The Centre for Research on Embedded Systems (CERES) and the Centre for Applied Intelligent Systems Research (CAISR). CERES focuses on cooperating embedded systems. CAISR focuses on intelligent systems with awareness of humans, situations, and self. The goal of both centers is to bridge the gap between enabling technologies and useful, innovative applications. To industry, centers are a research partner and an avenue for recruiting PhD and Masters graduates. To academia, they are partner in national and international, cutting-edge research.

### Upcoming events

- Warwick Tucker, UU, Validated Numerics, Jan. 16, 2013
- Robert (Corky) Cartwright, Rice University, Jan. 24, 2013
- Karl H. Johansson, KTH, Event-based control and estimation, Mar. 12, 2013
- Janos Sztipanovits, Vanderbilt University, Apr. 17, 2013
- Magnus Egerstedt, Georgia Tech, May 22, 2013

Videos of previous talks can be found at <http://halmstadcolloquium.org>

### **Course in Convex Optimization for Signal Processing and Communications:**

Eleftherios Karipidis at LiU/ISY/Communication systems will give a doctoral level course in Convex Optimization for Signal Processing and Communications. The main goal of this course is to introduce the basic theory of convex optimization, following the standard textbook by Boyd and Vandenberghe. The focus is on recognizing and formulating convex optimization problems, and introducing the algorithms that solve them efficiently. More information is available in

<http://www.commsys.isy.liu.se/en/student/doktorandkurser/CVXOPT4SPCOM>

External participants are welcome, please contact the instructor directly.

### **Program chairs**

ELLIIT researchers have been program chairs at the following international conferences:

- [Eurocrypt 2012](#), in Cambridge (Thomas Johansson)
- [Software Language Engineering 2012](#), in Dresden (Görel Hedin)
- Empirical Software Engineering and Measurement 2012, in Lund (see next item)

**International Symposium in Lund:**

The IEEE/ACM International Symposium on Empirical Software Engineering and Measurement ([ESEM](#)) was organized in Lund, Sep 19-20. Prof. Per Runeson LU was General Chair, and Prof. Emilia Mendes BTH and Prof. Martin Höst LU were program chairs.

**LCCC Workshop on Formal Methods:**

On April 17-19, 2013 LCCC is organizing a workshop on [Formal Verification of Embedded Control Systems](#). in Biskopshuset, Lund.

**Visually Supporting Deep Brain Stimulation Surgeries:**

Deep Brain Stimulation (DBS) is a surgical intervention that is known to reduce or eliminate the symptoms of common movement disorders, such as Parkinson's disease, dystonia, or tremor. During a DBS intervention, stimulating electrodes are implanted into specific brain regions, whereby correct placement is crucial. As the electrode placement is based on multi sensor data, visualization can help the surgeon to mentally fuse these modalities, take into account their uncertainties and finally place the electrodes. ELLIIT researchers have developed a system together with surgeons from the St. Barbara Hospital in Hamm, Germany, that combines the currently unconnected information channels, derives uncertainty margins based on these modalities and communicates this information in a way which reduces the cognitive overload involved in mental registration. Thus, the system gives the surgical team immediate fused access to preoperative imaging data, Microelectrode Recordings, and patient feedback, which reduces the time in the operating room and increases the precision of the placed electrode. Finally, it allows the surgeon to perform post-operation analyses to improve heuristics frequently employed during DBS interventions. The presented concepts will be presented at the IEEE Pacific Visualization conference.

Authors: Alexander Bock, Norbert Lang, Gianpaolo Evangelista , Ralph Lehrke, Timo Ropinski

Paper Title: Guiding Deep Brain Stimulation Interventions by Fusing Multimodal Uncertainty Regions

## Personalförändingar

**Dake Liu till Beijing Institute of Technology:**

Dake Liu, LiU, har antagit en framstående position på Beijing Institute of Technology. Han har därvid avsagt sig sin organisatoriska position som avdelningschef för Datorteknik och har även dragit ner på andra saker. Han kvarstår som professor med ansvar för sin forskargrupp på sex doktorander och en postdok. För verksamheten inom ELLIIT innebär det oförminskat engagemang plus ett förstärkt nätverk med Kina inom projektet.

**Anton Cervin till XDIN:**

Anton Cervin, LU/RT, kommer att vara tjänstledig för att pröva på att arbeta i industrin, till att börja med under 2013. Petru Eles, LiU, tar över som projektledare för ELLIIT projekt 3.2.

**Mehmet Burak Guldogan till Akara:**

Mehmet Burak Guldogan, who was postdoc at LiU 2011/2012 with an ELLIIT grant on passive radar, has now joined a strong radar group in Ankara, <http://radar.etu.edu.tr>

## Forskningsfinansiering

### Nya VR projekt:

ELLIITs medlemmar var synnerligen lyckosamma vid årets utdelning av bidrag från Vetenskapsrådet. Här följer en lista på de ELLIIT relaterade projekt som har beviljats (eventuellt saknas något projekt):

#### Rambidrag:

- "Synthesis of a Software Engineering Framework for Open Innovation through Empirical Research — SYNERGIES", Per Runeson LU/CS
- "Skalbara och resursbegränsade reglersystem", Anders Rantzer LU/RT

#### Projektbidrag:

- "Quality Optimization and Stability of Cyber-Physical Systems by Computing-Control-Communication Codesign", Petru Eles LiU/IDA
- "Händelsebaserade reglerkomponenter med prestandagränser", Anton Cervin LU/RT

Dessa två projekt är båda direkta fortsättningar på ELLIIT projektet 3.2 "Integrated Scheduling and Synthesis of Networked Embedded Event-Based Control Systems"

- "Active Control of Compressor Systems Based on New Methods of Nonlinear Dynamic Feedback Stabilization", Rolf Johansson LU/RT
- "Samtidig rörelseföljning och radiokanalskattning", Bo Bernhardsson LU/RT
- "Tekniker från kodningsteori i post-kvantkryptografi och kryptoanalys", Tomas Johansson, LU/EIT
- "Energieffektiva analog till digitalomvandlare med hög prestanda för bredbandskommunikation", Atila Alvandpour LiU/IDA
- "Interactive Tools based on Reference Attribute Grammars", Görel Hedin LU/CS
- "Visualiseringsdriven Iterativ Avbrusning av Bilder", Mikael Felsberg LiU
- "Exakta exponentielltidsalgoritmer", Thore Husfeldt LU/CS
- "Robusta och tillförlitliga metoder för modell Anpassning i datorseende", Fredrik Kahl LU/Math
- "En ny paradigm för systemdesign av kompakta MIMO terminaler", Buon Kiong Lau LU/EIT

#### Projektbidrag – Unga forskare:

- "Ansiktsdetektering och robust igenkänning med avseende på bilddeformationer", Fernando Alonso-Fernandez, HH
- "Medicinsk bildanalys med tensorröstning", Rodrigo Moreno Serrano LiU
- "Robusta metoder för 3D-rekonstruktion av statiska och icke-statiska objekt, scener och miljöer", Carl Olsson LU/Math
- "Millimetervågsändare med hög verkningsgrad i CMOS teknologi", Markus Törmänen LU/EIT

Utöver detta så är Pierre Nugues, LU/CS, medsökande i rambidraget "Mot kunskapsbaserad storskalig kunskapsutvinning ur svensk text" koordinerat av Göteborgs Universitet och Maria Kihl

(LU/EIT) och Anders Robertsson, Anton Cervin, Karl-Erik Årzén och Anders Rantzer (samtliga LU/RT) medsökande i rambidraget "Kapacitetsreglering för datormoln" koordinerat av Umeå Universitet.

#### **Nya VINNOVA projekt:**

- Model Driven Physical Systems Operation (MODRIO), Vinnova-financed ITEA-2 project, 34 partners. LiU-part: Peter Fritzson LiU/IDA, 5 MSEK.
- Strategic Innovation Program Cyber Security and Trustworthy ICT. Ben Smeets LU/EIT, Vinnova agenda project

#### **Nya KK projekt:**

- Företagsforskarskola i inbyggda och intelligenta system

Stiftelsen för kunskaps- och kompetensutveckling (KK-stiftelsen) har beviljat 14.4 Mkr till Högskolan i Halmstad som stöd under sex år för en företagsforskarskola i inbyggda och intelligenta system. Målet med företagsforskarskolan är att utbilda självständiga forskare (doktorer) som förstår och kan utveckla nästa generation inbyggda och intelligenta system, och framförallt den forskning som leder fram till dessa. Forskarskolan drivs av Högskolan i Halmstads största forskningsmiljö: Halmstad Embedded and Intelligent Systems Research. Forskarskolan drar dessutom fördel av kompetensen vid högskolans forskningsmiljö i innovationsvetenskap. Företagsforskarskolan ska stärka svensk industri genom att utbilda doktorer som har både tekniskt djup och en bredare förståelse för industriella krav och kunskap om industriella innovationsprocesser. Varje doktorand är knuten till ett företag, och genom KK-stiftelsens bidrag minskar företagets kostnad till hälften. Det finns fortfarande möjlighet för fler företag att ansluta sig. Intresserade uppmanas ta kontakt med professor Magnus Jonsson <magnus.jonsson@hh.se> tel. 035-167177 eller professor Bertil Svensson <bertil.svensson@hh.se> tel. 035-167131.

#### **EU projekt:**

- Two ELLIIT teams jointly received an FP7 Marie Curie IAPP grant for project MESH-WISE: Self-organising MESH Networking with Heterogeneous Wireless Access. Di Yuan (LiU) and B. Landfeldt (ELLIIT professor, LU) are the project coordinator and LU's scientist in charge, respectively. The project has an estimated budget of 1.7 million Euro, among which over 600,000 Euro are allocated to the two Swedish sites. The project starts formally in March 2013.
- FP7 Marie Curie IOF proposal Career-LTE: Capacity and Energy Efficiency Limits of Wireless Communications for Heterogeneous Long Term Evolution Advanced (LTE-A) Deployment, by Di Yuan (ITN, LiU), has been favourably evaluated and selected for grant negotiation. The grant award targets career development. The estimated budget of 300,000 Euro will be entirely allocated for Di Yuan's research with the University of Maryland, USA as the project partner.