



Newsletter



News

June - October 2016

User partner workshop

On October 10th and 11th, Certus hosted the workshop of fall 2016 at Soria Moria, Oslo.

The purpose of this workshop was to work together to trace a path for 2017 in the Annual Work Plan. The project leaders and user partners all presented the activities in their projects, and the challenges that lie ahead, which were considered in light of the plan for 2017.

Ideas to the outline of the new Annual Work Plan emerged as each party discussed and presented their main challenges.

Certus and Certus' user partners



New PhD Students

Certus has welcomed two new PhD students, Carl Martin Rosenberg and Helge Spieker, who both started at Simula during early fall.

Carl Martin Rosenberg will work in the context of Certus Project 9 on using machine-learning to ensure anti-fragile systems while Helge Spieker will work in Certus Project 8 on using machine learning to validate robotic systems.



Helge Spieker



Carl Martin Rosenberg

Certus sponsors Crash Course on Machine Learning

August 22-25th 2016, Simula hosted a Crash Course in Machine Learning (ML), which Certus co-sponsored.

ML as an Artificial Intelligence discipline takes a growing place in software development processes, and Certus researchers believe that more and more interesting AI-based techniques will help to foster innovation in this area.

The unique combination of competences at Simula on this topic makes it a perfect place to learn about ML, and Certus is also involved in teaching activities on this topic.

We are happy to report that several Certus board members and partners (including researchers from Simula) attended the course.



Mini symposium on healthcare registries at the Cancer Registry of Norway

On Tuesday, September 13th, The Cancer Registry of Norway organized a mini-symposium on “Utilizing Healthcare Registries for personalised cancer prevention and treatment”.

Certus attended the symposium alongside representatives from the Lawrence Livermore National Labs, BigInsight at the University of Oslo, Karolinska Institute, and of course the host Cancer registry of Norway.

The purpose of the seminar was to exchange information on the utilisation of healthcare registries as a valuable tool in cancer treatment.



Marine Louarn completes her internship at Certus and Simula

From Mar. to Sep. 2016, Certus hosted the internship of Marine Louarn while she was finalizing her Master degree from University of Rennes, Major of Biomedical engineering.

Working on FightHPV, this serious game for mobile phones co-jointly developed by the Cancer Registry and Simula, Marine designed an Artificial Intelligence model with the help of her supervisors, to understand how to verify the gameplay and release cervical cancer informations in the game.

Her work and its experimental results will lead to an initial publication in a major Conference in Artificial Intelligence in 2017.



Certus scientists receive Best Paper Award at ICSOFT-EA '16

We present our congratulations to Arnaud Gotlieb, Dusica Marijan and Alexandre Pétilion from the Certus Centre and Simula, and Mats Carlsson from SICS in Sweden.

This team of researchers has received the prestigious Best Paper Award at the 11th International Conference on Software Engineering and Applications, or ICSOFT-EA 2016, for their paper, titled “A New Approach to Feature-based Test Suite Reduction in Software Product Line Testing”.



Conferences attended

Since our last newsletter, Certus researchers have presented papers, or demonstrated Certus or adjacent project technologies at a number of conferences and workshops:

- Challenges and new Approaches for Dependable and Cyber-Physical Systems Engineering (De-CPS 2016), June 17, Pisa, Italy.
- Genetic and Evolutionary Computation Conference (GECCO), July 20-24, Denver, US
- 31st IEEE/ACM International Conference on Automated Software Engineering (ASE 2016), September 03-07, Singapore.
- Conference on Programming Languages (PROLE '16), September 13-16, Salamanca, Spain.
- International Systems and Software Product Line Conference (SPLC), September 19-23, Beijing, China
- 16th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM '16), October 02-03, Raleigh, USA.
- CM/IEEE 19th International Conference on Model Driven Engineering Languages and Systems (MODELS '16), October 02-07, St. Malo, France.
- 28th International Conference on Testing Software and Systems (ICTSS-2016), October 17-19, Graz, Austria.

Project updates

Project 9, EvolveIT, has made a breakthrough in the analysis and recommendation of fine-grained entities. Project leader Leon Moonen states that “Up to now, we could only analyse and recommend at a relative coarse-grained level (files), but we are able to do a much more detailed method level analysis and recommendation for Java, C, C++ and C#.”

EvolveIT has also created a website for disseminating public results: <http://evolveit.bitbucket.org/>

In December, Leon Moonen is co-organising a workshop on technical debt analytics. The workshop will address the following goals:

1. Calibrating technical debt and technical wealth related terminologies and concepts that are used indistinctly and interchangeably in software engineering literature.
2. Comparing, integrating, compiling and even reconciling empirical work on the effects of technical debt/technical wealth from economic and organisational perspectives.



Leon Moonen

Adjacent project updates

U-Test

The U-Test project was one of the H2020 CPS projects that was represented at the Workshop Challenges and New Approaches for Dependable and Cyber-Physical System Engineering (De-CPS 2016). The title of the presentation was “Tacking Uncertainty in Cyber-Physical Systems with Automated Testing”.

The aim of the workshop was to exchange results and ideas from the ongoing H2020 CPS projects. Several projects participated in the workshop including INTO-CPS, AXIOM, and PROXIMA. The results of U-Test achieved so far were presented during the workshop in addition to the presentation of the request of information for initiating the standardization of U-Taxonomy.

U-Test researchers have also contributed to the Request for Information for a new standard on “Uncertainty Modelling” in the Object Management Group.

U-Test researchers participated in the OMG technical meeting, Orlando, Florida in June. The first presentation was given by Tao Yue to the ADTF group. She presented the initial version of the Request for Information (RFI) for the new Uncertainty Modeling standard. The second presentation was given by Shaukat Ali from Simula to the SE DSIG meeting and System Modeling Assessment & Roadmap WG meeting. The focus was on the presentation of the UML Uncertainty Profile.

On September 14, 2016, Request for Information (RFI) for a new standard on “Uncertainty Modeling” in Object Management Group (OMG) was issued. This is the first step in standardisation at the Object Management Group.

MBE4CR

Researchers in MBE4CR have developed a tool, which they have named iOCL.

iOCL is an interactive Object Constraint Language (OCL) specification and validation framework. The framework is implemented as a web-based application. The main objective is to ease the specification of OCL constraints with tool support, such that applying OCL can be practically feasible. The framework has been evaluated via two controlled experiments and very positive results have been obtained.

The framework is integrated with a systematic, automated and cost-effective model-based approach for ensuring the quality of the evolving Automated Cancer Registry System, under the context of the MBE-CR project.

The tool is used by the Cancer Registry of Norway, and MBE4CR researchers have also demonstrated the tool at the ACM/IEEE 19th International Conference on Model Driven Engineering Languages and Systems.

Tao Yue



Publications

January to October 2016

Journal articles

R. BAGNARA, M. CARLIER, R. GORI AND A. GOTLIEB

Exploiting Binary Floating-Point Representations for Constraint Propagation
INFORMS Journal of Computing (JoC) 28, no. 1 (2016): 31-46.

J. L. DE LA VARA, M. BORG, K. WNUK AND L. MOONEN

An Industrial Survey of Safety Evidence Change Impact Analysis Practice
IEEE Transactions on Software Engineering (2016).

A. HERVIEU, D. MARIJAN AND A. GOTLIEB

Practical Minimization of Pairwise-Covering Test Configurations Using Constraint Programming
Information and Software Technology 71 (2016): 129-146.

L. MOONEN AND A. R. YAZDANSHENAS

Analyzing and Visualizing Information Flow in Heterogeneous Component-Based Software Systems
Information and Software Technology 77 (2016): 34-55.

S. WANG, S. ALI, A. GOTLIEB AND M. LIAAEN

A Systematic Test Case Selection Methodology for Product Lines: Results and Insights From an Industrial Case Study
Empirical Software Engineering 21, no. 4 (2016): 1586-1622.

Proceedings, refereed

S. ALI, T. YUE, X. QIU AND H. LU

Generating Boundary Values from OCL Constraints using Constraints Rewriting and Search Algorithms
In IEEE World Congress on Computational Intelligence., 2016.

A. ARRIETA, S. WANG, G. SAGARDUI AND L. ETXEBERRIA

Test Case Prioritization of Configurable Cyber-Physical Systems with Weight-Based Search Algorithms
In Genetic and Evolutionary Computation Conference (GECCO), 2016.

A. ARRIETA, S. WANG, G. SAGARDUI AND L. ETXEBERRIA

Search-Based Test Case Selection of Cyber-Physical System Product Lines for Simulation-Based Validation
In International Systems and Software Product Line Conference (SPLC), 2016.

S. DI ALESIO

Optimal Performance Tuning in Real-Time Systems using Multi-objective Constrained Optimization
In The 22nd International Conference on Principles and Practice of Constraint Programming (CP 2016), 2016.

A. GOTLIEB, M. CARLSSON, M. LIAAEN, D. MARIJAN AND A. PETILLON

Automated Regression Testing Using Constraint Programming
In Twenty-Eighth Conference on Innovative Applications of Artificial Intelligence (IAAI-16), Phoenix, AZ, USA, Feb. 2016., 2016.

L. MOONEN, S. DI ALESIO, D. BINKLEY AND T. ROLFSNES

Practical Guidelines for Change Recommendation using Association Rule Mining
In IEEE/ACM International Conference on Automated Software Engineering (ASE). ACM, 2016.

M. MOSSIGE, A. GOTLIEB AND H. MELING

Generating Tests for Robotized Painting Using Constraint Programming
In Int. Joint Conf. on Artificial Intelligence (IJCAI-16) - Sister Conference Best Paper Track. New York City, 2016.

D. PRADHAN, S. WANG, S. ALI AND T. YUE

Search-Based Cost-Effective Test Case Selection within a Time Budget: An Empirical Study
In Genetic and Evolutionary Computation Conference (GECCO). Denver, Colorado, USA, 2016.

D. PRADHAN, S. WANG, S. ALI, T. YUE AND M. LIAAEN

STIPI: Using Search to Prioritize Test Cases based on Multi-Objectives Derived from Industrial Practice
In The 28th International Conference on Testing Software and Systems (ICTSS). Graz, Austria: Lecture Notes in Computer Science, Springer Verlag, 2016.

T. ROLFSNES, L. MOONEN, S. DI ALESIO, R. BEHJATI AND D. BINKLEY

Improving Change Recommendation using Aggregated Association Rules
In 13th International Conference on Mining Software Repositories (MSR). ACM, 2016.

T. ROLFSNES, S. DI ALESIO, R. BEHJATI, L. MOONEN AND D. BINKLEY

Generalizing the Analysis of Evolutionary Coupling for Software Change Impact Analysis
In 23rd IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER). IEEE, 2016.

S. WANG, H. LU, T. YUE, S. ALI AND J. NYGÅRD

MBF4CR: A Model-Based Framework for Supporting An Automated Cancer Registry System
In 12th European Conference on Modelling Foundations and Applications (ECMFA 2016). Lecture Notes in Computer Science, Springer Verlag, 2016.

Proceedings, refereed (continued)

S. WANG, S. ALI, T. YUE, Ø. BAKKELI AND M. LIAAEN

Enhancing Test Case Prioritization in an Industrial Setting with Resource Awareness and Multi-Objective Search

In The 38th International Conference on Software Engineering (ICSE), Software Engineering in Practice (SEIP) track ., 2016.

S. WANG, S. ALI, T. YUE, Y. LI AND M. LIAAEN

A Practical Guide to Select Quality Indicators for Assessing Pareto-Based Search Algorithms in Search-Based Software Engineering

In the 38th International Conference on Software Engineering (ICSE)., 2016.

T. YUE, S. ALI, H. LU AND K. NIE

Search-based Decision Ordering to Facilitate Product Line Engineering of Cyber-Physical System

In International Conference on Model-Driven Engineering and Software Development., 2016.

T. YUE, H. ZHANG, S. ALI AND C. LIU

A Practical Use Case Modeling Approach to Specify Crosscutting Concerns: Industrial Applications

In International Conference on Software Reuse (ICSR)., 2016.

M. ZHANG, B. SELIC, S. ALI, T. YUE, O. OKARIZ AND R. NORGRÉN

Understanding Uncertainty in Cyber-Physical Systems: A Conceptual Model

In European Conference on Modelling Foundations and Applications(ECMFA)., 2016.

Technical reports

T. MA, S. ALI AND T. YUE

Conceptually Understanding Uncertainty in Self-Healing Cyber-Physical Systems

Simula Research Laboratory, 2016.

L. MOONEN, S. DI ALESIO, D. BINKLEY AND T. ROLFSNES

Practical Guidelines for Change Recommendation using Association Rule Mining

Simula Research Laboratory, 2016.

P. H. NGUYEN, S. ALI AND T. YUE

Model-Based Security Engineering for Cyber-Physical Systems: A Systematic Mapping Study

Simula Research Laboratory, 2016.

Talks, contributed

S. ALI, T. YUE AND M. ZHANG

Tackling Uncertainty in Cyber-Physical Systems with Automated Testing

In DE-CPS Workshop, Pisa, Italy., 2016.