Main Events

ICMT ’17  
July 17-18, 2017

ICGT ’17  
July 18-19, 2017

ECMFA ’17  
July 19-20, 2017

TAP ’17  
July 19-20, 2017

TTC ’17  
July 21, 2017

Satellite Events

Doctoral Symposium ’17  
July 17, 2017

GCM ’17  
July 17, 2017

Projects Showcase ’17  
July 18, 2017

OCL ’17  
July 20, 2017

MORSE ’17  
July 21, 2017

BigMDE ’17  
July 21, 2017

GRAND ’17  
July 21, 2017
Table of Contents

Welcome to STAF 2017 ........................................................................................................... 3
Program Overview .................................................................................................................... 4
Venue Overview ....................................................................................................................... 5
  Ground Floor ......................................................................................................................... 5
  First Floor ............................................................................................................................. 5
Detailed Program ..................................................................................................................... 6
  Monday ................................................................................................................................. 6
  Tuesday ................................................................................................................................. 8
  Wednesday ........................................................................................................................... 11
  Thursday ............................................................................................................................... 13
  Friday .................................................................................................................................. 16
Keynotes .................................................................................................................................. 21
  ICMT Keynote – Monday 17 July, 9:00, Room Zuse ......................................................... 21
  ICGT Keynote – Tuesday 18 July, 9:00, Room Zuse ......................................................... 22
  ECMFA Keynote – Wednesday 19 July, 9:00, Room Zuse ............................................... 23
  TAP Keynote – Thursday 20 July, 9:00, Room Zuse ....................................................... 24
Industry Talk .......................................................................................................................... 25
  Wednesday 19 July, 13:15, Room Zuse ........................................................................... 25
Main Events ............................................................................................................................ 26
  10th International Conference on Model Transformation (ICMT’17) .................. 26
  10th International Conference on Graph Transformation (ICGT’17) ................. 27
  13th European Conference on Modelling Foundations and Applications (ECMFA’17) .................................................................................................................. 28
  11th International Conference on Tests and Proofs (TAP’17) ..................................... 29
  10th Transformation Tool Contest (TTC’17) .............................................................. 30
Satellite Events ....................................................................................................................... 31
  STAF 2017 Doctoral Symposium .................................................................................. 31
  Projects Showcase ’17 ...................................................................................................... 32
  OCL and Textual Modeling (OCL’17) ............................................................................ 32
  Model-Driven Robot Software Engineering (MORSE’17) .......................................... 33
  Scalable Model Driven Engineering (BigMDE’17) ..................................................... 34
  Grand Challenges in Modeling (GRAND’17) ............................................................. 34
Social Events .......................................................................................................................... 35
  Welcome Reception ......................................................................................................... 35
  Guided Tour “Old Town” ............................................................................................... 35
  Conference Dinner ......................................................................................................... 35
  Midterm Reception ........................................................................................................ 36
  Guided Tour “Casemates” ............................................................................................ 36
Venue and Directions ............................................................................................................ 36
  Conference Venue ........................................................................................................ 37
  Directions to Social Events .......................................................................................... 37
Organization ........................................................................................................................ 38
  Organizing Committee ................................................................................................. 38
  Steering Committee .................................................................................................... 38
Welcome to STAF 2017

We cordially welcome you to the 5th edition of the STAF federate scientific event on Software Technologies: Applications and Foundations at the Philipps-Universität in Marburg, Germany.

STAF is a federation of leading conferences on software technologies. It was formed after the end of the successful TOOLS federated event in 2012, providing a loose umbrella organisation with a steering committee that aims to provide continuity, and running annually.

It is our great pleasure to host STAF this year at the Philipps-Universität Marburg, Germany. Philipps-Universität is not only a German university steeped in tradition, it is also the oldest university in the world that was founded as a Protestant institution in 1527. It has been a place of research and teaching for nearly five centuries. Nowadays there are nearly 25,700 students studying in Marburg – 12 percent of them coming from all over the world.

Over five days, STAF 2017 will host 12 events devoted to applications and foundations of software technologies. We are very happy that the conferences ECMFA, ICGT, ICMT, and TAP, as well as the long-running transformation tool contest TTC continue their participation in STAF this year, again. STAF 2017 also continues its Doctoral Symposium, as well as the Projects Showcase event initiated two years ago. Furthermore, five workshops devoted to specialized topics of software technologies take part in STAF 2017. STAF 2017 features four internationally renowned keynote speakers sharing their deep insights on future challenges and trends in software technologies, as well as one industrial talk.

We would like to express our gratitude to all the institutions and sponsors that supported STAF 2017. Many thanks go to all chairs, organizers, steering committee members, program committee members, external reviewers, and local volunteers for their hard work in organizing the conferences and satellite events of STAF 2017. We also thank the keynote speakers, authors, presenters, and participants who contribute with their work and participation to the success of STAF 2017.

Enjoy the conference, the food, the hospitality of Philipps-Universität Marburg, and the beautiful and charming environment of the city of Marburg!

How to access the Internet at the conference

To access the Internet, you can connect your device to SSID City-Wifi. After connecting a window opens, where you can either select “Limited Internet Access” for two hours of access, or “Full Internet Access” and register with your email address for unlimited access. CityWifi is not only available at the conference site, but throughout several locations in Marburg, e.g., the market place, the station square, and at several bus stops.

How to access the proceedings

Participants of the STAF 2017 can access the proceedings of the federated events via the STAF 2017 homepage (http://www.informatik.uni-marburg.de/staf2017/), by clicking Proceedings in the navigation bar.
Venue Overview

Ground Floor

*The room Zuse will be used for plenary sessions. For individual sessions, it will be split into the rooms Pascal 1 and Pascal 2.

The registration will be open daily from 8am.

First Floor
Monday

09:00 – 10:30
ICMT Keynote
Room Zuse
Mark van den Brand, Esther Guerra
Ramon Schiffelers
Empowering High Tech Systems Engineering Using MDSE Ecosystems

10:30 – 11:00
Coffee Break

11:00 – 12:30
ICMT Session 1: Transformation Paradigms, Languages, Algorithms and Strategies
Room Pascal 1
Daniel Strüber
Artur Boronat
Experimentation with a Big-Step Semantics for ATL Model Transformations
Christopher Gerking, David Schubert, Ingo Budde
Reducing the Verbosity of Imperative Model Refinements by using General-Purpose Language Facilities
Edward Willink
The Micromapping Model of Computation; the Foundation for Optimized Execution of Eclipse QVTc/QVTr/UMLX

GCM Session 1
Room Pascal 2
Ivaylo Hristakiev, Detlef Plump
Checking Graph Programs for Confluence
Berthold Hoffmann, Mark Minas
Generating Efficient Predictive Shift-Reduce Parsers for Hyperedge Replacement Grammars
Alessio Mansutti, Marino Miculan, Marco Peressotti
Loose Graph Simulations

12:30 – 14:00
Lunch Break

14:00 – 15:30
ICMT Session 2: Development of Transformations
Room Pascal 1
Mark van den Brand
Loli Burgueño, Frank Hilken, Antonio Vallecillo, Martin Gogolla
Testing Transformation Models Using Classifying Terms
Timo Kehrer, Christopher Pietsch, Daniel Strüber
Differencing of Model Transformation Rules: Towards Versioning Support in the Development and Maintenance of Model Transformations

Kevin Lano, Shekoufeh Kolahdouz Rahimi, Sobhan Yassipour Tehrani, Mohammadreza Sharbaf
A Survey of Model Transformation Design Pattern Usage

GCM Session 2
Room Pascal 2

Nikos Mylonakis
A Graph Semantics for a Variant of the Ambient Calculus more Adequate for Modeling Service Oriented Computing

Timothy Atkinson, Detlef Plump, Susan Stepney
Probabilistic Graph Programming

Nebras Nassar, Jens Kosiol, Hendrik Radke
Rule-based Repair of EMF Models: Formalization and Correctness Proof

Doctoral Symposium Session 1
Room Aiken

Alexandru Burdusel
Optimisation Methods for Model-Driven Engineering

Sina Madani
Parallel Execution of Model Management Programs

Abdullah E. Alhejaili
Action Inferences from IoT Devices: a Risk Detection Case Study Applied in Smart Home

15:30 – 16:00
Coffee Break

16:00 – 18:00
ICMT Session 3: Applications and Case Studies
Room Pascal 1

Daniel Strüber
Generating Efficient Mutation Operators for Search-Based Model-Driven Engineering

Oszkár Semeráth, Daniel Varró
Graph Constraint Evaluation over Partial Models by Constraint Rewriting
Nebras Nassar, Hendrik Radke, Thorsten Arendt
Rule-based Repair of EMF Models: An Automated Interactive Approach

GCM Session 3
Room Pascal 2

Alexandru Burdusel, Steffen Zschaler
Automatic generation of evolution rules for model-driven optimisation

Ernst Althaus, Andreas Hildebrandt, Domenico Mosca
Graph Rewriting Based Search for Molecular Structures: Definitions, Algorithms, Hardness

Doctoral Symposium Session 2
Room Aiken

Dennis Nolte
Analysis and Abstraction of Graph Transformation Systems via Type Graphs

Anke Stüber
Rule Formats for Nominal Modal Transition Systems

Arve Gengelbach
On the Foundation of Isabelle/HOL

Tuesday
09:00 – 10:30
ICGT Keynote
Room Zuse
Georg Gottlob
General and Fractional Hypertree Decompositions: Hard and Easy Cases

10:30 – 11:00
Coffee Break

11:00 – 12:30
Joint Session ICMT 4 and ICGT 1: Triple Graph Grammars
Room Zuse
Erhan Leblebici, Anthony Anjorin, Lars Fritsche, Gergely Varró, Andy Schürr
Leveraging Incremental Pattern Matching techniques for Model Synchronization (ICGT)

Frank Trollman, Sahin Albayrak
Decision Points for Non-Determinism in Concurrent Model Synchronization with Triple Graph Grammars (ICMT)
Jeremy Ho, Jens Weber, Morgan Price
BXE2E: A Bidirectional Transformation Approach for Medical Record Exchange (ICMT)

Projects Show Case Session 1
Room Newton

Richard Paige, Athanasios Zolotas, Dimitris Kolovos, John McDermid
SECT-AIR: Software Engineering Costs and Timescales — Aerospace Initiative for Reduction

Elvira Albert, Pablo C. Cañizares, Esther Guerra, Juan De Lara, Esperanza Marcos, Manuel Núñez, Guillermo Román-Diez, Juan Manuel Vara, Damiano Zanardini
SICOMORo-CM: Development of Trustworthy Systems via Models and Advanced Tools

Ran Wei, Tim Kelly, Richard Hawkins, Eric Armengaud
DEIS: Dependability Engineering Innovation for Cyber-Physical Systems

12:30 – 14:00
Lunch Break

14:00 – 15:30
Joint Session ICMT 5 and ICGT 2: Rule-based Specifications and Tools
Room Zuse

Timo Kehrer, Abdullah Alshanqiti, Reiko Heckel
Automatic Inference of Rule-Based Specifications of Complex In-Place Model Transformations (ICMT)

Daniel Strüber, Kristopher Born, Kanwal Daud Gill, Raffaela Groner, Timo Kehrer, Manuel Ohrndorf, Matthias Tichy
Henshin: A Usability-Focused Framework for EMF Model Transformation Development (ICGT)

Jens Weber
Grape: A Graph Rewriting and Persistence Engine (ICGT)

Albert Zündorf, Daniel Gebauer, Clemens Reichmann
Table Graphs (ICGT)
Projects Show Case Session 2  
*Room Newton*

Alessandra Bagnato, Konstantinos Barmpis, Juri Di Rocco, Davide Di Ruscio, Tamas Gergely, Dimitris Kolovos, Pedro Malo, Richard Paige, Diomidis Spinellis, Nik Bessis, Luis Adrián Cabrera-Diego, Ioannis Korkontzelos, Philippe Krief, Jose Manrique Lopez de La Fuente, Stéphane Laurière, Cedric Thomas, Jurgen Vinju and Scott Hansen

Developer-Centric Knowledge Mining from Large Open-Source Software Repositories (CROSSMINER)

Simos Gerasimou, Dimitris Kolovos, Richard Paige, Michael Standish

Technical Obsolescence Management Strategies for Safety-Related Software for Airborne Systems

Malgorzata Zofia Goraczek, Michael Sachs, Oliver Terbu, Lei Zhu, Birgit Scholz, Georg Egger-Sidlo, Sebastian Zehetbauer, Stefan Vogl

Mobile e-Card. Demonstrating the realization of an mHealth application in Austria

15:30 – 16:00  
**Coffee Break**

16:00 – 18:00  
**ICGT Session 3: Foundations**

*Room Zuse*

Andrea Corradini, Dominique Duval, Rachid Echahed, Frederic Prost, Leila Ribeiro

The PB-PO Approach to Algebraic Graph Transformation

Julia Padberg

Transformations of Corecursive Graphs: Hierarchical Graph Transformation Revisited

Thomas Bellet, Agnès Arnould, Hakim Belhaouari, Pascale Le Gall

Geometric Modeling: Consistency Preservation Using Two-Layered Variable Substitutions

Jakob Lykke Andersen, Christoph Flamm, Daniel Merkle, Peter F. Stadler

Chemical Graph Transformation with Stereo-Information
Wednesday

09:00 – 10:30

**ECMFA Keynote**

*Room Zuse*

Lionel C. Briand

Model-driven verification and testing of cyber-physical systems: Tackling Scalability and Practicality Challenges

Anthony Anjorin, Huáscar Espinoza

10:30 – 11:00

Coffee Break

11:00 – 12:30

**ECMFA Session 1: Meta-Modeling and Language Engineering**

*Room Zuse*

Mark van den Brand

Alexander Kraas

On the Automated Derivation of Domain-Specific UML Profiles

Lorenzo Addazi, Federico Ciccozzi, Philip Langer, Ernesto Posse

Towards Seamless Hybrid Graphical-Textual Modelling for UML and Profiles

Evgeny Kusmenko, Alexander Roth, Bernhard Rumpe, Michael von Wenckstern

Modeling Architectures of Cyber-Physical Systems

**ICGT Session 4: Graph Languages and Parsing**

*Room Leibnitz*

Andy Schürr

Andrea Corradini, Barbara König, Dennis Nolte

Specifying Graph Languages with Type Graphs

Hans-Jörg Kreowski, Sabine Kuske, Aaron Lye

Fusion Grammars: A Novel Approach to the Generation of Graph Languages

Frank Drewes, Berthold Hoffmann, Mark Minas

Predictive Shift-Reduce Parsing for Hyperedge Replacement Grammars

**TAP Session 1: Model-based Testing**

*Room Newton*

Achim D. Brucker

Marcus Gerhold, Mariëlle Stoelinga

Model-Based Testing of Probabilistic Systems with Stochastic Time

Andreas Fuchs, Herbert Kuchen

Unit Testing of Database-Driven Java Enterprise Edition Applications
Afef Jmal Maalej, Moez Krichen, Mohamed Jmaiel
WSCLim: A Tool for Model-Based Testing of WS-BPEL Compositions under Load Conditions

12:30 – 13:15
Lunch Break

13:15 – 14:00
Industry Talk

Room Zuse

Dennis Klassen
Requirements for Traceability and Test Coverage in German Common Criteria Schema

14:00 – 15:30
ECMA Session 2: Model Evolution and Maintenance

Room Zuse

Arvid Butting, Arne Haber, Lars Hermerschmidt, Oliver Kautz, Bernhard Rumpe, Andreas Wortmann
Systematic Language Extension Mechanisms for the MontiArc Architecture

Davide Di Ruscio, Juergen Etzlstorfer, Ludovico Iovino, Alfonso Pierantonio, Wieland Schwinger
A Feature-based Approach for Variability Exploration and Resolution in Model Transformation Migration

Lorena Arcega, Jaime Font, Oystein Haugen, Carlos Cetina
On the Influence of Models at Run-time Traces in Dynamic Feature Location

ICGT Session 5: Analysis and Verification

Room Leibnitz

Kristopher Born, Leen Lambers, Daniel Strüber, Gabriele Taentzer
Granularity of Conflicts and Dependencies in Graph Transformation Systems

Johannes Dyck, Holger Giese
K-Inductive Invariant Checking for Graph Transformation Systems

Maria Maximova, Holger Giese, Christian Krause
Probabilistic Timed Graph Transformation Systems

TAP Session 2: Tutorial

Room Newton

Achim D. Brucker, Burkhart Wolff
Theorem Prover-based Testing: Combining Verification and Testing

15:30 – 16:00
Coffee Break
Joint Session ECMFA 3 and TAP 3: Model Verification and Analysis
Room Zuse

Amir Shayan Ahmadian, Daniel Strüber, Volker Riediger, Jan Jürjens
Model-based Privacy Analysis in Industrial Ecosystems (ECMFA)

Martin Gogolla, Frank Hilken, Philipp Niemann, Robert Wille
Formulating Model Verification Tasks Prover-Independently as UML Diagrams (ECMFA)

Hichem Debbi
Modeling and Formal Analysis of Probabilistic Complex Event Processing (CEP) Applications (ECMFA)

Giles Reger, Martin Suda and Andrei Voronkov
Testing a Saturation-Based Theorem Prover: Experiences and Challenges (TAP)

Thursday

09:00 – 10:30
TAP Keynote
Room Zuse

Reiner Hähnle
Abstraction Refinement for the Analysis of Software Product Lines

10:30 – 11:00
Coffee Break

11:00 – 12:30
ECMFA Session 4: Model Consistency Management
Room Pascal 1

Harald König, Zinovy Diskin
Efficient Consistency Checking of Interrelated Models

Hao Wu
Finding Achievable Features and Constraint Conflicts for Inconsistent Metamodels

Gerson Sunyé
Model Consistency for Distributed Collaborative Modeling
TAP Session 4: Static and Dynamic Analysis
Room Pascal 2

Gergő Barany, Julien Signoles
Hybrid Information Flow Analysis for Real-World C Code

Katalin Fazekas, Marijn J. H. Heule, Martina Seidl, Armin Biere
Skolem Function Composition for Quantified Boolean Formulas

Katsuhiko Ikeshita, Fuyuki Ishikawa, Shinichi Honiden
Test Suite Reduction in Idempotence Testing of Infrastructure as Code

OCL Session 1
Room Newton

Opening and warm-up

Kevin Lano, Sobhan Yassipour Tehrani, Shekoufeh Kolahdouz Rahimi
Translating OCL to ANSI C

More Models and Then A Lot More Models
Mapping USE Specifications into Spec#

12:30 – 14:00 Lunch Break

14:00 – 15:30 ECMFA Session 5: Model-Driven Generative Development
Room Pascal 1

Roland Kluge, Michael Stein, David Giessing, Andy Schürr, Max Mühlhäuser
cMoflon: Model-Driven Generation of Embedded C Code for Wireless Sensor Networks

Enes Yigitbas, Hagen Stahl, Stefan Sauer, Gregor Engels
Self-Adaptive UIs: Integrated Model-Driven Development of UIs and their Adaptations

Dennis Priefer, Peter Kneisel, Daniel Strüber
Iterative Model-Driven Development of Software Extensions for Web Content Management Systems

TAP Session 5: Symbolic Execution and Testing
Room Pascal 2

Imen Boudhiba, Christophe Gaston, Pascale Le Gall, Virgile Prevosto
Symbolic Execution of Transition Systems with Function Summaries
Martin Gogolla, Frank Hilken, Khanh-Hoang Doan and Nisha Desai
Checking UML and OCL Model Behavior with Filmstripping and Classifying Terms

**OCL Session 2**
*Room Newton*

Edward Willink
Deterministic Lazy Mutable OCL Collections

Frédéric Jouault, Olivier Beaudoux, Matthias Brun, Fabien Chhel, Mickael Clavreul
Improving Incremental and Bidirectional Evaluation with an Explicit Propagation Graph

Hao Wu
Step 0: An Idea for Automatic OCL Benchmark Generation

15:30 – 16:00 **Coffee Break**

16:00 – 18:00 **ECMFA Session 6: Experience Reports, Case Studies, and New Application Scenarios**  
*Room Pascal 1*

Hamza Ed-Douibi, Javier Luis Canovas Izquierdo, Jordi Cabot
Example-driven Web API Specification Discovery

Alessio Bucaioni, Saad Mubeen, Federico Ciccozzi, Antonio Cicchetti, Mikael Sjödin
Technology-Preserving Transition from Single-Core to Multi-Core in Modelling Vehicular Systems

Abel Gómez, Xabier Mendialdua, Gábor Bergmann, Jordi Cabot, Csaba Debreceni, Antonio Garmendia, Dimitris S. Kolovos, Juan de Lara, Salvador Trujillo
On the Opportunities of Scalable Modeling Technologies: An Experience Report on Wind Turbines Control Applications Development

**OCL Session 3**  
*Room Newton*

Open Discussion and Lightning Talks
Friday
09:00 – 10:30

**TTC Session 1**
*Room Pascal 1*

**Welcome**

**Introduction to the State Elimination case study**

Georg Hinkel
NMF

Daniel Strüber
Henshin

Alexander Weidt, Albert Zündorf
SDMLib

Mohammadreza Sharbaf, Shekoufeh Kolahdouz-Rahimi, Bahman Zamani
Epsilon

Christoph Eickhoff, Simon-Lennert Raesch, Philipp Kolodziej
Yage

**BigMDE Session 1: Keynote**
*Room Pascal 2*

**Opening**

**Eike Stepper**
How Scalable Are My Models? (Keynote)

**Steven Kelly**
Collaborative Modelling with Version Control

**GRAND Session 1**
*Room Newton*

**Jordi Cabot, Robert Clarisó, Marco Brambilla, Sébastien Gerard**
Cognifying Model-Driven Software Engineering

**Arvid Butting, Timo Greifenberg, Bernhard Rumpe, Andreas Wortmann**
Taming the Complexity of Model-Driven Systems Engineering Projects

**Juri Di Rocco, Davide Di Ruscio, Ludovico Iovino, Ralf Lämmel, Alfonso Pierantonio**
MDE Adoption—A Three-legged
Tanja Mayerhofer, Benoit Combemale
The Tool Generation Challenge for Executable Domain-Specific Modeling Languages

Discussion

MORSE Session 1: Keynote
Room Aiken

Davide Di Ruscio
Keynote

10:30 – 11:00
Coffee Break

11:00 – 12:30
TTC Session 2
Room Pascal 1

Introduction to the FamiliesToPersons case study

Georg Hinkel
NMF

Lano, Shekoufeh Kolahdouz Rahimi
UML-RSDS

Alexander Weidt, Albert Zündorf
SDMLib

Tassilo Horn
FunnyQT

Leila Samimi-Dehkordi, Bahman Zamani, Shekoufeh Kolahdouz-Rahimi
EVL+Strace

Christoph Eickhoff, Simon-Lennert Raesch, Philipp Kolodziej
Yage

BigMDE Session 2
Room Pascal 2

Bugra Mehmet Yildiz, Christoph Bockisch, Arend Rensink, Mehmet Aksit
A Java Bytecode Metamodel for Composable Program Analyses

Thibault Bézières La Fosse, Massimo Tisi, Jean-Marie Mottu
Towards a Model-Driven Framework for Dynamic Program Analysis

Tamás Fekete, Gergely Mezei
Introduction of an OpenCL-based model transformation engine
GRAND Session 2
Room Newton

Antonio Garcia-Dominguez, Nelly Bencomo
Non-Human Modelers: Can They Work?

Vinay Kulkarni, Sreedhar Reddy
Towards developing right systems – a model-driven approach

Zinovy Diskin, Harald König, Mark Lawfor
Toward a Sound Theory for Global Consistency Management

Steven Kelly
Modelling By the People, For the People

Discussion

MORSE Session 2: Scenario-based Development and Simulation
Room Aiken

Daniel Gritzner, Joel Greenyer
Synthesizing Executable PLC Code for Robots from Scenario-based GR(1) Specifications

Achiya Elyasaf, David Harel, Assaf Marron, Gera Weiss
Towards Synergistic Integration of Context-based and Scenario-based Development

Christopher Werner, Sebastian Götz, Uwe Aßmann
A Simulation Framework to Analyze Knowledge Exchange Strategies in Distributed Self-adaptive Systems

12:30 – 14:00
Lunch Break

14:00 – 15:30
TTC Session 3 (until 16:30)
Room Pascal 1

Introduction to the Smart Grid case study

Georg Hinkel
NMF

Sven Peldszus, Jens Bürger, Daniel Strüber
eMoflon

Introduction to the Live Contest and solutions

Awards and Wrap Up
BigMDE Session 3
Room Pascal 2

Steven Kelly
Industrial scale modelling with MetaEdit+

Antonio Garmendia, Esther Guerra, Juan de Lara
Creating scalable modelling environments with EMFSplitter

Antonio Garcia-Domínguez
Flexible Incremental Graph Visualisations of Models with Epsilon and Zest

Gerson Sunye
Creating and Querying Large Models with NeoEMF

GRAND Session 3
Room Newton

Martin Gogolla, Frank Hilken, Andreas Kaestner
Some Narrow and Broad Challenges in MDD

Manuel Wimmer, Robert Bill, Alexandra Mazak, Birgit Vogel-Heuser
On the Need for Temporal Model Repositories

Önder Babur, Loek Cleophas, Mark van den Brand, Bedir Tekinerdogan, Mehmet Aksit
More Models and Then A Lot More Models

Discussion

MORSE Session 3: Behavior and Interaction Modelling
Room Aiken

Martin Gogolla, Antonio Vallecillo
(An Example for) Formally Modeling Robot Behavior with UML and OCL

Norman Köster, Sebastian Wrede, Philipp Cimiano
Evaluating a Graph Query Language for Human-Robot Interaction Data in Smart Environments

Gary Cornelius, Nico Hochgeschwender, Holger Voos
Model-Driven Interaction Design for Social Robots

15:30 – 16:00
Coffee Break
16:00 – 18:00

**BigMDE Session 4**  
*Room Pascal 2*

*Lars Fritsche, Erhan Leblebici, Andy Schürr*  
Consistency checking between co-evolved models using eMoflon

Discussion and wrap-up

**GRAND Session 4**  
*Room Newton*

Discussion and Consolidation

**MORSE Session 4**  
*Room Aiken*

Panel and Open Discussion
Empowering High Tech Systems Engineering Using MDSE Ecosystems

**Ramon Schiffelers, ASML, NL**

ASML is the world’s leading provider of complex lithography systems for the semiconductor industry. To keep up with the increasing performance, evolvability and predictability requirements, ASML increasingly adopts model driven engineering methods and techniques within its development processes. Models are developed and used for different purposes in several phases of the development process. There is not a single modeling language and analysis tool to address all these use cases. Instead, so-called Multi-Disciplinary Systems Engineering (MDSE) ecosystems are developed that seamlessly integrate dedicated (modeling) languages and tools for a given domain of interest. More specific, a MDSE ecosystem is an intuitive integrated development environment that consists of domain specific languages (DSLs) formalizing the domain in which engineers can model their system at hand. It contains transformations to transform these models automatically to one or more aspect models that form the inputs for (COTS) tools for rigorous analysis of (non)functional properties, and synthesis tools to generate (code) artifacts to be used at run-time. Here, model transformations formalize and automate the relations between the various domain and aspect models. This presentation discusses both the technical and organizational challenges that have been overcome to develop and adopt these MDSE ecosystems, as well as challenges to be addressed next.

**Biography:**

Ramon Schiffelers is a software architect at ASML, world’s leading provider of lithography systems for the semiconductor industry, and assistant professor at the department of Mathematics and Computer Science at the Eindhoven University of Technology.

Within ASML, he is leading a research group (+/ 20 fte) consisting of (SW) architects, scientific programmers, (academic) researchers, and PhD, PDEng, and MSc students. Together with this group, he combines state-of-the-art methods and techniques from academia with state-of-the-practice in industry into so-called multi-disciplinary system engineering (MDSE) ecosystems. These ecosystems empower their users to develop complex, large-scale, software intensive systems.

Such (domain specific) ecosystems integrate domain formalizations in terms of domain specific languages (DSLs), aspect models and tools for rigorous analysis and synthesis, automated model re-constructors and model inference algorithms to deal with legacy software components using model transformations that automate and formalize relations between different languages and models. He has successfully introduced several MDSE ecosystems in the development process and products of ASML.
Hypertree decompositions, the more powerful generalized hypertree decompositions (GHDs), and the yet more general fractional hypertree decompositions (FHD) are hypergraph composition methods successfully used for answering conjunctive queries and for solving constraint satisfaction problems. Each hypergraph $H$ has a width relative to each of these methods: its hypertree width $hw(H)$, its generalized hypertree width $ghw(H)$, and its fractional hypertree width $fhw(H)$, respectively. While $hw(H) \leq k$ can be checked in polynomial time, the complexity of checking whether $fhw(H) \leq k$ holds for a fixed constant $k$ was unknown. We settle this problem by proving that checking whether $fhw(H) \leq k$ is NP-complete, even for $k=2$ and by same construction also the problem deciding whether $ghw(H) \leq k$ is NP-complete for $k \geq 2$. Hardness was previously known for $k \geq 3$, whilst the case $k=2$ has remained open since 2001.

Given these hardness results, we investigate meaningful restrictions, for which checking for bounded $ghw$ is easy. We study classes of hypergraphs that enjoy the bounded edge-intersection property (BIP) and the more general bounded multi-edge intersection property (BMIP). For such classes, for each constant $k$, checking whether $ghw(H) \leq k$, and if so, computing a GHD of width $k$ of $H$ is tractable and actually FPT. Finally we derive some approximability results for $fhw$. We consider classes of hypergraphs whose $fhw$ is bounded by a constant $k$ and which also enjoy the BIP or MIP, or bounded VC-dimension. For each hypergraph in such a class, we are able to compute an FHD of width $O(k \log k)$ efficiently. A different restriction on classes of hypergraphs gives a linear approximation in PTIME. Hypergraphs of bounded rank are a simple example of such a class. Joint work with Wolfgang Fischl and Reinhard Pichler.

Biography:
Georg Gottlob is a Professor of Informatics at Oxford University, a Fellow of St John’s College, Oxford, and an Adjunct Professor at TU Wien. His interests include AI, knowledge representation, logic and complexity, web data extraction, database theory, graph decomposition techniques. Gottlob is an ACM Fellow, an ECCAI Fellow, a Fellow of the Royal Society, and a member of the Austrian Academy of Sciences, the German National Academy of Sciences, and the Academia Europaea. He chaired the Program Committees of IJCAI 2003 and ACM PODS 2000, was the Editor in Chief of the Journal Artificial Intelligence Communications, and is currently a member of the editorial boards of journals, such as JACM and the Journal of Computer and System Sciences. Gottlob was awarded an ERC Advanced Investigator’s Grant for the project “DIADEM: Domain-centric Intelligent Automated Data Extraction Methodology” (see also http://diadem.cs.ox.ac.uk/).
Model-Driven Verification and Testing of Cyber-Physical Systems: Tackling Scalability and Practicality Challenges

Lionel Briand, University of Luxembourg, LU

This talk will report on various research collaboration projects with industry and the lessons learned we drew regarding the verification and testing of cyber-physical systems. Specific issues related to the uncertainty and dynamic behaviour of such systems will be addressed.

Novel and general solutions will be presented for Model-In-the-Loop (MIL) testing — a common practice in the embedded software industry — and results from Simulink and timed automata models in the automotive domain will be presented. Beyond this scope, more complex situations will be considered and future research plans will be outlined.

Biography:

Lionel Briand is professor and FNR PEARL chair in software verification and validation at the SnT centre for Security, Reliability, and Trust, University of Luxembourg. He also acts as vice-director of the centre. Lionel started his career as a software engineer in France (CS Communications & Systems) and has conducted applied research in collaboration with industry for more than 22 years.

Until moving to Luxembourg in January 2012, he was heading the Certus center for software verification and validation at Simula Research Laboratory, where he was leading applied research projects in collaboration with industrial partners. Before that, he was on the faculty of the department of Systems and Computer Engineering, Carleton University, Ottawa, Canada, where he was full professor and held the Canada Research Chair (Tier I) in Software Quality Engineering. He has also been the software quality engineering department head at the Fraunhofer Institute for Experimental Software Engineering, Germany, and worked as a research scientist for the Software Engineering Laboratory, a consortium of the NASA Goddard Space Flight Center, CSC, and the University of Maryland, USA.

Lionel has been on the program, steering, or organization committees of many international, IEEE and ACM conferences. He is the coeditor-in-chief of Empirical Software Engineering (Springer) and is a member of the editorial boards of Systems and Software Modeling (Springer) and Software Testing, Verification, and Reliability (Wiley). He was on the board of IEEE Transactions on Software Engineering from 2000 to 2004.

Lionel was elevated to the grade of IEEE Fellow in 2010 for his work on the testing of object-oriented systems. He was granted the IEEE Computer Society Harlan Mills award and the IEEE Reliability Society engineer-of-the-year award for his work on model-based verification and testing, respectively in 2012 and 2014. His research interests include: software testing and verification, model-driven software development, search-based software engineering, and empirical software engineering.
TAP Keynote – Thursday 20 July, 9:00, Room Zuse

Abstraction Refinement for the Analysis of Software Product Lines

Reiner Hähnle, Technical University of Darmstadt, DE

We generalize the principle of counter example-guided data abstraction refinement (CEGAR) to guided refinement of Software Product Lines (SPL) and of analysis tools. We also add a problem decomposition step. The result is a framework for formal SPL analysis via guided refinement and divide-and-conquer, through sound orchestration of multiple tools.

Biography:

Reiner Hähnle received a Diploma and a Ph.D. in Computer Science from University of Karlsruhe and a Habilitation from Technical University of Vienna. From 2000 he was Associate Professor and from 2002 Full Professor of Computer Science at Chalmers University. Since 2011 he holds the Chair of Software Engineering at Technical University Darmstadt. He worked as a guest researcher at ICOT Tokyo, University of Tübingen, University of Turin, and University of Oslo. He authored and edited 180 international, peer-reviewed publications and served on 100 programme committees. Reiner was one of the founders of the Tableaux conference, a founding trustee of FLoC Inc., PC Chair of IJCAR, Tableaux, and TAP, as well as Wine Chair of ECOOP. His research interests include formal analysis and verification of OO languages, executable software models, tool-assisted debugging, test generation. Reiner is founder of the KeY verification system for Java and a co-designer of the executable modelling language ABS.
Requirements for Traceability and Test Coverage in German Common Criteria Schema

Dennis Klassen, itemis AG, DE

In the age of global digitalisation and IoT, the need for more security increases day by day. More and more organizations receive a request from the government to certify products according to technical requirements or the Common Criteria (CC) by the BSI. The German certification process for CC as well as the high effort for test development and documentation present a problem especially for newcomers. In addition to the necessary CC-specific documentation, the security functional requirements (sfr) need to be treated differently than the usual functional requirements. Thus the traceability of the sfr’s from the protection profile (pp) up to the test results is a challenge. In this presentation, we will show the CC process with possible occurring bottle-necks and discuss possible solutions for developers. One solution can be e.g. a requirements traceability tool with partial or full test case generation. The first problem to solve is the acceptance of the tool by the BSI. Furthermore we will share our experience in this specific discipline. This task takes a lot of know how in different domains, like domain specific knowledge about target of evaluation (toe), test suite development, requirement engineering and common criteria evaluation.
Main Events

10th International Conference on Model Transformation (ICMT’17)

July 17 – 18, 2017

The International Conference on Model Transformation (ICMT) is the premier forum for researchers and practitioners alike from all areas of model transformation.

Model transformation encompasses a variety of technical spaces including modelware, grammarware, dataware, and ontoware; a variety of model representations, e.g., based on different types of graphs; and a variety of transformation paradigms including rule-based transformations, term rewriting, and model manipulation using general-purpose programming languages, to mention just a few.

The study of model transformation includes foundations, structuring mechanisms and properties (e.g., modularity, composability, reusability, and parameterization of transformations), transformation languages, techniques, and tools. To achieve impact on software engineering in general, methodologies and tools are required to integrate model transformation into existing development environments and processes.

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Dynamic structures are a major cause for complexity when it comes to model and reason about systems. They occur in software architectures, models, pointer structures, databases, networks, etc. As collections of interrelated elements, which may be added, removed, or change state, they form a fundamental modelling paradigm as well as a means to formalise and analyse systems. Applications include architectural reconfigurations, model transformations, refactoring, and evolution of a wide range of artefacts, where change can happen either at design or run time.

Based on the observation that these structures can be represented as graphs and their modifications as graph transformations, theory and applications of graphs, graph grammars, and graph transformation systems have been studied in our community for more than 40 years. The conference aims at fostering interaction within this community as well as attracting researchers from other areas, either in contributing to the theory of graph transformation or by applying graph transformation to established or novel areas.

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Model-Based Engineering (MBE) is an approach to the design, analysis and development of software and systems that relies on exploiting high-level models and computer-based automation to achieve significant boosts in both productivity and quality. The ECMFA conference series is dedicated to advancing the state of knowledge and fostering the industrial application of MBE and related approaches. Its focus is on engaging the key figures of research and industry in a dialog which will result in stronger and more effective practical application of MBE, hence producing more reliable software based on state-of-the-art research results. ECMFA 2017 will be co-located with ICMT, ICGT, and TAP as part of the STAF federation of conferences, leading conferences on software technologies. The joint organization of these prominent conferences provides a unique opportunity to gather practitioners and researchers interested in all aspects of software technology, and allow them to interact with each other.

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The TAP conference promotes research in verification and formal methods that targets the interplay of proofs and testing: the advancement of techniques of each kind and their combination, with the ultimate goal of improving software and system dependability.

Dijkstra's famous remark that "testing shows the presence, not the absence of bugs" contributed to reinforcing the opinion that program testing and program proving are antithetical techniques. Under the traditional view, proving aims at establishing correctness, whereas testing aims at uncovering errors: a correct program needs no testing, and there's no point in trying to prove a buggy one. As a result, research in verification has historically been divided into separate communities, with only few interested in both testing and proving.

This attitude has changed significantly over the last decade. Verification research has seen a convergence of heterogeneous techniques and a synergy between traditionally distinct communities. Testing and proving are increasingly seen as complementary rather than mutually exclusive techniques: formal testing can increase the confidence in the correctness of program parts that are hard to reason about formally, and proving can help make testing more efficient and systematic. The TAP conference aims to promote research in the intersection of testing and proving by bringing together researchers and practitioners from both areas of verification.

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Martin Gogolla        

29
10th Transformation Tool Contest (TTC’17)

July 21, 2017

Transformations of structured data such as relational data, abstract syntax trees and high-level graph-based models are cross-disciplinary at the heart of a wide range of applications. The success of transformation approaches heavily depends on the availability of expressive and efficient tools. Currently, a large variety of tools exist for different transformation approaches. However, for potential users, working in application domains where transformation techniques may be useful, it is difficult to select the right tool for their purpose. Moreover, even for most of the tool experts it is true that they know about one or two tools but little about others. Finally, the tool developers themselves can also be inspired by a more detailed understanding of related approaches.

The aim of this event is to evaluate and compare the expressiveness, the usability, and the performance of transformation tools for structured data along a number of selected challenging case studies. That is, we want to learn about the pros and cons of each tool considering different applications. A deeper understanding of the relative merits of different tool features will help to further improve the existing tools, to indicate open problems, and to integrate and standardize transformation tools.

There is a wide range of application domains of transformation tools, including software engineering, business intelligence, logistics, healthcare and bioinformatics, as well as semantic web and social network analysis.

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Steering Committee
Richard Paige, Bernhard Schatz, Pieter Van Gorp, Albert Zündorf
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Satellite Events

STAF 2017 Doctoral Symposium

July 17, 2017

The goal of the Doctoral Symposium is to provide a forum in which PhD students can present their work in progress. The symposium supports students by providing independent and constructive feedback about their already completed and, more importantly, planned research work. The symposium will be accompanied by prominent experts who will actively participate in critical discussions.

Co-Chairs
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Juan De Lara  Jeff Gray

Graph Computation Models (GCM’17)

July 17, 2017

Graphs are common mathematical structures which are visual and intuitive. They constitute a natural and seamless way for system modeling in science, engineering, and beyond, including computer science, life sciences, business processes, etc. Graph computation models constitute a class of very high-level models where graphs are first-class citizens. They generalize classical computation models based on strings or trees, such as Chomsky grammars or term rewrite systems. Their mathematical foundation, in addition to their visual nature, facilitates specification, validation and analysis of complex systems. A variety of computation models have been developed using graphs and rule-based graph transformation. These models include features of programming languages and systems, paradigms for software development, concurrent calculi, local computations and distributed algorithms, and biological and chemical computations.

Program Chair
Andrea Corradini

Program Committee
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Rachid Echahed  Dirk Janssens  Mohamed Mosbah  Leila Ribeiro
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3rd Event Dedicated to International and National Project Dissemination and Cooperation (Projects Showcase)

July 18, 2017

The Projects Showcase event at STAF 2017 provides an opportunity for researchers and practitioners (from both academia and industry) involved in accepted, ongoing or completed research projects related to foundations and applications of software technologies to share results, experiences, ideas, on-going work, and knowledge that can lead to fruitful inter-project collaboration.

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OCL and Textual Modeling (OCL’17)

July 20, 2017

Modeling started out with UML and its precursors as a graphical notation. Such visual representations enable direct intuitive capturing of reality, but they have weaknesses: for example, detailed visual representations bear the risk of becoming overcrowded faster than textual models and some of the visual features lack the level of precision required to create complete and unambiguous specifications. These weaknesses of graphical notations encouraged the development of text-based modeling languages that either integrate with or replace graphical notations for modeling. Typical examples of such languages are OCL, textual MOF, Epsilon, and Alloy. Textual modeling languages have their roots in formal language paradigms like logic, programming and databases

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Model-Driven Robot Software Engineering (MORSE’17)

July 21, 2017

It is impossible to imagine today's production facilities without robots. With precise and optimized hardware/software solutions, they automate many steps in modern manufacturing. Since the required hardware gets cheaper, the available software solutions more sophisticated, and their acceptance within society increases, robots will become a more common part of daily life as well. In contrast to production, where all external influencing factors are known and explicitly treated at design-time, the development of software for robots operating in unpredictable environments (such as service robots) requires new and more sophisticated approaches. Over the last decades, research in robotics made huge progress, especially in the fields of recognition, image processing, knowledge representation, planning, control, and collaboration. However, robotic researchers mainly concentrate on creating hardware/software solutions for specialized tasks. This leads to a landscape of isolated solutions which cannot be reused and combined easily. Furthermore, today's approaches lack comprehensive software engineering methodologies and abstractions for handling the increased heterogeneity and complexity of robotic software systems. Hence, there is a need to incorporate software engineering principles within the development of future robot platforms.

Unfortunately, robot applications fundamentally differ from classical software systems. For instance, the available hardware platforms for robots are highly heterogeneous and there is neither hardware nor software standardization, making cross-product development intractable. Moreover, the variety of possible usage scenarios and their implications on the necessary quality criteria requires several distinct development processes and models. Furthermore, the dynamic interaction of multiple robots will inevitably lead to unwanted emergent behavior, violating safety constraints and, thus, potentially cause severe damage.

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Scalable Model Driven Engineering (BigMDE’17)
July 21, 2017

As Model Driven Engineering (MDE) is increasingly applied to larger and more complex systems, the current generation of modelling and model management technologies are being pushed to their limits in terms of capacity and efficiency. As such, additional research and development is imperative in order to enable MDE to remain relevant with industrial practice and to continue delivering its widely-recognised productivity, quality, and maintainability benefits.

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Grand Challenges in Modeling (GRAND’17)
July 21, 2017

The main goal of this workshop is to bring together researchers and practitioners active in the fields of Modeling and Model-Driven Engineering in order to analyze the status of the adoption of Model-Driven Engineering in the different domains, and identify and define the challenges to be met in order to cope with the evolutionary pressure due to the changing landscape of complex software systems. Overall, the future of MDE is filled with many diverse opportunities for research studies and technology development. These opportunities are of interest to both the extant software industry and the scientific community that have been active in modeling, model-based software engineering, and model-driven engineering. While it has been possible to develop a perspective about many categories of research problems, additional cooperative efforts are necessary to identify and re-examine the grand challenges the community has to meet.

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Welcome Reception

*Monday July 17, 2017, 19:15h, Town Hall*

The Welcome Reception will be held at the late-gothic Town Hall from the early 16th century, located at the central market-place. Since over 400 years one can see and hear the same amusing spectacle every full hour: From the renaissance gable on the roof of the town hall an old cockerel flaps his wings accompanied by harsh, tinny trumpet blasts. During the welcome reception, drinks and finger food will be served.

Guided Tour “Old Town”

*Tuesday July 18, 2017, 18:30h*

Fascinating narrow lanes, crooked steps, superbly restored half-timbered houses and venerable old churches. The old town of Marburg invites you to wander and to spend a little time to appreciate its own special charm. Everywhere you are confronted with clues and evidences which document the lives of the great who lived here. Such figures as the Brothers Grimm, Martin Luther and the Nobel prize winner Emil von Behring all left their mark. The guided tour will end just in time at the Landgrafenschloss where the conference dinner will be held.

Conference Dinner

*Tuesday July 18, 2017, 19:30h, Landgrafenschloss*

The conference dinner takes place at the historic castle Landgrafenschloss, which towers high above the Marburg old town. The first Hessian landgrave Heinrich I, grandchild of the Holy Elisabeth, extensively remodeled and extended the existing castle (originating in the 9th and 10th century) and used it as his residence in the 13th century. In 1493 the foundation stone of the youngest building, the Wilhelmsbau, was laid, which today houses the university’s museum for cultural history.
Midterm Reception

Wednesday July 19, 2017, 19:00h, Barrio Santo

The cozy Barrio Santo bar hosts the midterm reception. From its roof-deck, you have a beautiful view on St. Elisabeth’s Church, Marburg’s most famous building.

Guided Tour “Casemates”

Thursday July 20, 2017, 19:00h

In the immediate neighbourhood to the Marburg castle, you can explore a very special location. Via antique stairways you will descend into the former fortification, the casemates. They provide a vivid impression of the combat conditions of former times. Also, the “Witch Tower” with its prison cells is part of this special guided tour.
Venue and Directions

Conference Venue
The conference will be held at the Technologie- und Tagungszentrum Marburg Softwarecenter 3 35037 Marburg, Germany

Directions to Social Events
Reception on Monday
Rathaus
Markt 1
35037 Marburg

Guided Tour “Old Town” on Tuesday
We meet near the well at the market place:
Markt 2
35037 Marburg

Conference Dinner on Tuesday
Landgrafenschloss
Schloss 1
35037 Marburg

Midterm Reception on Wednesday
Barrio Santo
Elisabethstraße 9
35037 Marburg

Guided Tour “Casemates” on Thursday
We meet near the display case at the castle wall, opposite of the bus stop of route 10:
Landgrafenschloss
Schloss 1
35037 Marburg
Organization

Organizing Committee

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Philipps University Marburg, Germany

Local Chair
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Philipps University Marburg, Germany

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