

FM 2014

Program Book



FM2014

19th International Symposium
on Formal Methods
Singapore May 12-16 2014



Welcome Message from the Organising Committee

Welcome to FM2014! Welcome to Singapore! This is the nineteenth in a series of symposia organised by Formal Methods Europe, this is its first time in Asia! The conference is jointly organized by three Singapore universities NUS, NTU, SUTD and a French-Singapore joint research lab IPAL. FM week is May 12-16, 2014 at the NUS, with a strong core technical program. Additionally six workshops and five tutorials focusing on specific formal methods for various application areas are planned to be held early in the FM week. We would like to express our heart-felt thanks to the PC Chairs: Cliff Jones, Pekka Pihlajasaari, Jun Sun; the Doctoral Symposium Chair: Annabelle McIver; the Workshop Chair: Shengchao Qin; the Publicity Chairs: Jonathan Bowen, Kenji Taguchi; the Tutorial Chair: Richard Paige; Financial/Local Chair: Yang Liu; the local organising committee members: Guangdong Bai, Manman Chen, Jianqi Shi, Ling Shi, Shuang Liu, Yan Liu and workshop organisers, tutorial presenters and many student helpers, for their hard work to make FM2014 successful.

Jin Song Dong
FM 2014 General Chair



Overall Program

12 May, 2014	13 May, 2014
Workshops FMTV Tutorials Tutorial 2 (Full Day) Tutorial 5 (Full Day)	Workshops UTP FSFMA AI4FM ESSS Tutorials Tutorial 1 (Full Day) Tutorial 3 (am) and 4 (pm) Doc Symposium

14 May, 2014	15 May, 2014	16 May, 2014
FM 2014 Keynote 1 Session 1A /1B Lunch Session 2A/2B Session 3A/3B Reception	FM 2014 Keynote 2 Session 4A/4B Lunch Session 5 Banquet	FM 2014 Keynote 3 Session 6 Lunch Session 7

**Please note that:* For 12-13 May, here are the suggested timings of breaks: Morning break:10:30-11:00; Lunch: 12:30-2:00pm; Afternoon break: 3:30-4:00pm, some workshops/tutorials may have a bit different timings.



Social Events

Welcome Reception-Chicken Rice Buffet

Date & Time: 19:00 – 21:00, 14 May. 2014

Location: Kent Ridge Guild House

Address: National University of Singapore, Kent Ridge Guild House 9 Kent Ridge Drive Singapore 119241

Introduction: *Hainanese chicken rice, locally known as Chicken Rice, is tender soft chicken (steamed or roasted) served on or with fragrant rice. It is accompanied with light soy sauce, coriander leaves, sesame oil, and a flavourful garlic-chilli dip. Chicken Rice is a traditional food in Singapore and it is loved by all Singaporeans. The Chicken buffet also includes other dishes.*



Conference Banquet

Date & Time: 17:30– 21:00, 15 May. 2014

Location: Jurong Bird Park

Address: 2 Jurong hill, Singapore 628925

Transportation: The shuttle bus will leave from School of Computing at 4:45pm.



Tutorials

12 May, 2014

Unifying Theories of Programming in Isabelle/HOL

09:10-17:00, Location: SR2 COM1-02-04

Presenter: Jim Woodcock and Simon Foster (University of York, UK)

The Correctness-by-Construction Approach to Programming

09:00-17:00, Location: SR6 COM1-02-03

Presenter: Bruce Watson (Stellenbosch, SA) and Derrick Kourie (University of Pretoria, SA)

13 May, 2014

Collaborative Modelling and Co-simulation: Tools and techniques for Designing Embedded Systems

09:00-17:00, Location: SR5 COM1-02-01

Presenter: John Fitzgerald and Ken Pierce (Newcastle University, UK), Peter Gorm Larsen (Aarhus University, Denmark)

Formal Model-Driven Engineering

09:00-12:00, Location: TR10 COM1-02-17

Presenter: James Welch, Jeremy Gibbons and Jim Davies (University of Oxford, UK)

BACH: From Bounded Reachability Analysis of Linear Hybrid Automata To Online Verification of Industrial Cyber-Physical System

14:00-17:00, Location: TR10 COM1-02-17

Presenter: Lei Bu and Xuandong Li, Nanjing University

Workshops & Doctoral Symposium

12 May, 2014

1st Formal Methods for Timing Verification Workshop (FMTV' 14)

09:00-18:00, Location: SR5 COM1-02-01

13 May, 2014

3rd International Workshop on Engineering Safety and Security Systems (ESSS' 14)

09:20-17:00, Location: SR6 COM1-02-03

A Satellite Workshop of FM 2014 (AI4FM)

09:00-16:00, Location: SR2 COM1-02-04

2nd French Singaporean Workshop on Formal Methods and Applications (FSFMA' 14)

09:00-18:00, Location: VC Room COM1-02-13

5th International Symposium on Unifying Theories of Programming (UTP' 14)

09:30-17:00, Location: SR3 COM1-02-12

Doctoral Symposium

09:00-16:00, Location: Cerebro COM1-02-05

FM 2014 Program

14 May, 2014

Opening

08:45-09:00, Location: LT 15

David S. Rosenblum, Jin Song Dong and Cliff Jones

Keynote Speaker 1: 09:00-10:00

[Keynote1]	GERWIN KLEIN (NICTA)
Title	PROOF ENGINEERING CONSIDERED ESSENTIAL
Time and Date	09:00-10:00, Wednesday, 14 April, 2014
Room	LT 15
Chair	Jun Sun

Morning Tea Break: 10:00-10:30

Session 1A

10:30-12:30, Location: LT 15
Chair: Ian Hayes

Co-induction Simply: Automatic Co-inductive Proofs in a Program Verifier

Rustan Leino, Michał Moskal

Proof Patterns for Formal Methods

Leo Freitas, Iain Whiteside

Flexible Invariants Through Semantic Collaboration

Nadia Polikarpova, Julian Tschannen, Carlo A. Furia, Bertrand Meyer

Verification of a Transactional Memory Manager under Hardware Failures and Restarts

Ognjen Marić, Christoph Sprenger

Session 1B

10:30-12:30, Location: SR1 COM1-02-06
Chair: Lijun Zhang

Formal Verification of Operational Transformation

Yang Liu, Yi Xu, Shaojie Zhang, Chengzheng Sun

SCJ: Memory-Safety Checking without Annotations

Chris Marriott, Ana Cavalcanti

A Refinement Based Strategy for Local Deadlock Analysis of Networks of CSP Processes

Pedro Antonino, Augusto Sampaio, Jim Woodcock

Revisiting Compatibility of Input-Output Modal Transition Systems Krka

Ivo Krka, Nicolas D'Ippolito, Nenad Medvidovic, Sebastian Uchitel

Lunch: 12:30-14:00

Session 2A

14:00-16:00, Location: LT 15
Chair: Bernhard Aichernig

Temporal Precedence Checking for

Session 2B

14:00-16:00, Location: SR1 COM1-02-06
Chair: Ralf Huuck

A Graph-based Transformation Reduction to

Switched Models and its Application to a Parallel Landing Protocol

Parasara Sridhar Duggirala, Le Wang, Sayan Mitra, Mahesh Viswanathan, Cesar Munoz

Refactoring, Refinement, and Reasoning: A Logical Characterization for Hybrid Systems

Stefan Mitsch, Jan-David Quesel, André Platzer

When Equivalence and Bisimulation Join Forces in Probabilistic Automata

Yuan Feng, Lijun Zhang

Automatic Compositional Synthesis of Distributed Systems

Werner Damm, Bernd Finkbeiner

Reach UPPAAL States Faster

Jonas Rinast, Sibylle Schupp, Dieter Gollmann

Management of Time Requirements in Component-based Systems

Yi Li, Tian Huat Tan, Marsha Chechik

A Symbolic Algorithm for the Analysis of Robust Timed Automata

Piotr Kordy, Rom Langerak, Sjouke Mauw, Jan Willem Polderman

Invariants, Well-founded Statements and Real-time Program Algebra

Ian Hayes, Larissa Meinicke

Afternoon Tea Break: 16:00-16:30

Session 3A

16:30-18:30, Location: LT 15
Chair: Ana Cavalcanti

Object Propositions

Ligia Nistor, Jonathan Aldrich, Stephanie Balzer, Hannes Mehnert

Algebraic Principles for Rely-Guarantee Style Concurrency Verification Tools

Alasdair Armstrong, Victor B. F. Gomes, Georg Struth

Efficient Tight Field Bounds Computation based on Shape Predicates

Pablo Ponzio, Nicolas Rosner, Nazareno Aguirre, Marcelo Frias

Contracts in Practice

H.-Christian Estler, Carlo A. Furia, Martin Nordio, Marco Piccioni, Bertrand Meyer

Session 3B

16:30-18:30, Location: SR1 COM1-02-06
Chair: Yang Liu

Compositional Synthesis of Concurrent Systems through Causal Model Checking and Learning

Shang-Wei Lin, Pao-Ann Hsiung

Checking Liveness Properties of Presburger Counter Systems using Reachability Analysis

Vasanta Lakshmi K, Aravind Acharya, Raghavan Komondoor

IscasMC: A Web-Based Probabilistic Model Checker (tool paper)

Ernst Moritz Hahn, Yi Li, Sven Schewe, Andrea Turrini, Lijun Zhang

Automated Real Proving in PVS via MetiTarski (tool paper)

William Denman, Cesar Munoz

15 May, 2014

Keynote Speaker 2: 09:00-10:00

[Keynote2]	Zhenjiang Hu (National Institute of Informatics)
Title	VALIDITY CHECKING OF PUTBACK TRANSFORMATIONS IN BIDIRECTIONAL PROGRAMMING
Time and Date	09:00-10:00, Thursday, 15 April, 2014
Room	LT 15
Chair	Cliff B Jones

Morning Tea Break: 10:00-10:30

Session 4A

10:30-12:30, Location: LT 15
Chair: Sjouke Mauw

Computing Quadratic Invariants with Min- and Max-Policy Iterations: a Practical Comparison

Pierre Roux, Pierre-Loic Garoche

Precise Predictive Analysis for Discovering Communication Deadlocks in MPI Programs

Subodh Sharma, Vojtech Forejt, Daniel Kroening, Ganesh Narayanaswamy

Quiescent Consistency: Defining and Verifying Relaxed Linearizability

John Derrick, Heike Wehrheim, Brijesh Dongol, Gerhard Schellhorn, Bogdan Tofan, Oleg Travkin

The VerCors Tool Set for Verification of Concurrent Programs (tool paper)

Stefan Blom, Marieke Huisman

Session 4B: Industry Track A

10:30-12:30, Location: SR1 COM1-02-06
Chair: Peter Gorm Larsen

Formal Verification of a Descent Guidance Control Program of a Lunar Lander

Hengjun Zhao, Mengfei Yang, Naijun Zhan, Bin Gu, Liang Zou, Yao Chen

MDP-based Reliability Analysis of an Ambient Assisted Living System

Yan Liu, Lin Gui, Yang Liu

Formal Verification of Lunar Rover Control Software Using UPPAAL

Lijun Shan

Diagnosing Industrial Business Processes: Early Experiences

Suman Roy, A. S. M. Sajeev, Srivibha Sripathy

Lunch: 12:30-14:00

Session 5

14:00-16:00, Location: LT 15, Chair: John Fitzgerald

Efficient Runtime Monitoring with Metric Temporal Logic: A Case Study in the Android Operating System

Hendra Gunadi, Alwen Tiu

Efficient Self-Composition for Weakest Precondition Calculi

Christoph Scheben, Peter Schmitt

The Wireless Fire Alarm System: Ensuring Conformance to Industrial Standards through Formal Verification

Sergio Feo-Arenis, Bernd Westphal, Daniel Dietsch, Marco Muniz, Ahmad Siyar Andisha
Formalizing and Verifying a Modern Build Language

Afternoon Tea Break: 16:00-16:30

Conference Banquet: 17:30-21:00

16 May, 2014

Keynote Speaker 3: 09:00-10:00

[Keynote3]	Jim Woodcock (University of York)
Title	ENGINEERING UTOPIA FORMAL SEMANTICS FOR CML
Time and Date	09:00-10:00 , Friday, 16 April, 2014
Room	LT 15
Chair	Jin Song Dong

Morning Tea Break: 10:00-10:30

Session 6

10:30-12:30, Location: LT 15, Chair: Lindsay Groves

Definition, Semantics, and Analysis of Multirate Synchronous AADL

Kyungmin Bae, Peter Olveczky, Jose Meseguer

A Modular Theory of Object Orientation in Higher-Order UTP

Frank Zeyda, Thiago Santos, Ana Cavalcanti, Augusto Sampaio

A Simplified Z Semantics for Presentation Interaction Models

Judy Bowen, Steve Reeves

40 Years of Formal Methods (distinguished talk)

Dines Bjørner

Lunch/FME Meeting: 12:30-14:00, Location: SR1

Session 7

14:00-16:00, Location: LT 15, Chair: Dominique Méry

TrustFound: Towards a Formal Foundation for Model Checking Trusted Computing Platforms

Guangdong Bai, Jianan Hao, Jianliang Wu, Yang Liu, Zhenkai Liang, Andrew Martin

Knowledge-based Automated Repair of Authentication Protocols

Borzoo Bonakdarpour, Reza Hajisheykhi, Sandeep Kulkarni

Towards a Formal Analysis of Information Leakage for Signature Attacks in Preferential Elections

Roland Wen, Annabelle McIver, Carroll Morgan

Log Analysis for Data Protection Accountability

Denis Buti, Daniel Le Métayer

Closing Session: 16:00-16:15

Transportation

Airport to NUS

1. From the airport, take MRT Green Line towards the Joo Koon station. Alight at the Clementi station.
2. Take bus service no. 96 at Clementi Bus Interchange. Alight at Kent Ridge Crescent - NUS Raffles Hall. (bus stop number: 16169).

Hotel to Conference Venue

The FM organisation will provide free shuttle bus service between conference venue and this hotel. The timetable is listed as below:

Date	Time	Route
12 May, 2014	8:00am	Concorde to NUS
	6:05pm	NUS to Concorde
13 May, 2014	8:00am	Concorde to NUS
	6:05pm	NUS to Concorde
14 May, 2014	7:40am	Concorde to NUS
	8:45pm	NUS to Concorde
15 May, 2014	8:00am	Concorde to NUS
	9:00pm	Bird Park (Coach Stand) to Concorde
16 May, 2014	8:00am	Concorde to NUS
	4:30pm	NUS to Concorde

Taxi Information

Taxi rides are cheap in Singapore and you can easily find one along the road. Alternatively, you can call a taxi with a \$3 booking fee.

To come to the conference place, you can tell the taxi driver to go to NUS and then go to School of Computing, Building COM1.

Check the following page for more details:

<http://www.comp.nus.edu.sg/maps/location.html>

You can call a taxi using the following numbers:

Cab Comfort: 65521111

Cab SMRT: 65558888

Map of LT 15 and COM1 Level 2

