Israa AlAttili, Fred Houben, Georgeta Igna, Steffen Michels, Feng Zhu and Frits Vaandrager. Adaptive Scheduling of Data Paths using Uppaal Tiga
Abstract. We apply Uppaal Tiga to automatically compute adaptive scheduling strategies for an industrial case study dealing with a state-of-the-art image processing pipeline of a printer. As far as we know, this is the first application of timed automata technology to an industrial scheduling problem with uncertainty in job arrivals.

Marco Bernardo. Markovian Testing Equivalence and Exponentially Timed Internal Actions
Abstract. In the theory of testing for Markovian processes developed so far, exponentially timed internal actions are not admitted within processes. When present, these actions cannot be abstracted away as their execution takes a nonzero amount of time. On the other hand, they must be carefully taken into account in order not to equate processes that are distinguishable from a timing viewpoint. In this paper we recast the definition of Markovian testing equivalence in the framework of a Markovian process calculus including exponentially timed internal actions. Then we show that the resulting behavioral equivalence is a congruence, has a sound and complete axiomatization, has a modal logic characterization, and can be decided in polynomial time.

Ukachukwu Ndukwu. Combining Proof-Based Verification With Model Checking For Probabilistic Systems
Abstract. This paper presents a novel approach for augmenting proof-based systems with performance-style analysis of the kind employed in state-of-the-art model checking tools for probabilistic systems. Quantitative safety properties usually specified as probabilistic system invariants and modeled in proof-based environments are evaluated using bounded model checking techniques.

Our specific contributions include the establishment of a procedure, and a full implementation of the procedure in a prototype system (YAGA) which readily transforms a model specified in a proof-based environment to its equivalent verifiable PRISM model equipped with reward structures. The reward structures capture the exact interpretation of the probabilistic invariants and can reveal succinct information about the model during experimental investigations. Finally, we demonstrate the novelty of the technique on a probabilistic library case study.

Mathijs Schuts, Feng Zhu, Faranak Heidarian and Frits Vaandrager. Modelling Clock Synchronization in the Chess gMAC WSN Protocol
Abstract. We present a detailled timed automata model of the clock synchronization algorithm that is currently being used in a wireless sensor network that has been developed by the Dutch company Chess. Using the Uppaal model checker, we establish that in certain cases a static, fully synchronized network may eventually become unsynchronized if the current algorithm is used, even in a setting with very small clock drifts.

Nikola Trcka. Strong, Weak and Branching Bisimulation for Transition Systems and Markov Reward Chains: A Unifying Matrix
Abstract. We first study labeled transition systems with explicit successful termination. We establish the notions of strong, weak, and branching bisimulation in terms of boolean matrix theory, introducing thus a novel

and powerful algebraic apparatus. Next we consider Markov reward chains which are standardly presented in real matrix theory. By interpreting the obtained matrix conditions for bisimulations in this setting, we automatically obtain the definitions of strong, weak, and branching bisimulation for Markov reward chains. The obtained strong and weak bisimulations are shown to coincide with some existing notions, while the obtained branching bisimulation is new but its usefulness is questionable.

Hao Wang and Wendy MacCaull. Verifying Real-Time Systems using Explicit-time Description Methods

Abstract. Timed model checking has been extensively researched in recent years. Many new formalisms with time extensions and tools based on them have been presented. On the other hand, Explicit-Time Description Methods aim to verify real-time systems with general untimed model checkers. Lamport presented an explicit-time description method using a clock-ticking process (Tick) to simulate the passage of time together with a group of global variables for time requirements. This paper proposes a new explicit-time description method with no reliance on global variables. Instead, it uses rendezvous synchronization steps between the Tick process and each system process to simulate time. This new method achieves better modularity and facilitates usage of more complex timing constraints. The two explicit-time description methods are implemented in DIVINE, a well-known distributed-memory model checker. Preliminary experiment results show that our new method, with better modularity, is comparable to Lamport's method with respect to time and memory efficiency.