

# Dagstuhl Seminar 09411

## Interaction versus Automation: The two Faces of Deduction

4. 10. – 9. 10. 2009

Monday, October 5, 2009

| <i>Time</i> |         | <i>Speaker</i>  | <i>Title</i>   |
|-------------|---------|---|--|
| 9:00        | – 9:15  | Introduction  |  |
|             |         | <i>Program Verification and Symbolic Execution</i>      |  |
| 9:15        | – 9:45  | Reiner Hähnle   | Symbolic Execution and Partial Evaluation                                    |
| 9:45        | – 10:15 | Vladimir Klebanov                                       | Deductive Verification of Multi-threaded Java Programs by Symbolic Execution |
| 10:30       | – 11:00 | Coffee Break  |  |
|             |         | <i>Theorem Proving and Real Numbers</i>                 |  |
| 11:00       | – 11:30 | André Platzer   | Automated Deduction for Hybrid Systems                                       |
| 11:30       | – 12:00 | Assia Mahboubi  | Simplex Algorithm and Formal Proofs  |
| 12:15       | – 14:00 | Lunch   |  |
|             |         | <i>Applying Theorem Provers in Program Verification</i> |  |
| 14:00       | – 14:30 | Thomas Ball   | The SMT “Big Bang”: Applications of Z3 in Microsoft                          |
| 14:30       | – 15:00 | Michael Norrish   | Verifying C Code in a Microkernel  |
| 15:00       | – 15:30 | Makarius Wenzel   | On Prover Interaction and Integration with Isabelle/Scala                    |
| 15:45       | – 16:30 | Coffee Break  |  |
|             |         | <i>Theorem Proving and Termination</i>                  |  |
| 16:30       | – 17:00 | Carsten Fuhs  | Inductive Theorem Proving meets Dependency Pairs                             |
| 17:00       | – 17:30 | René Thiemann   | Certifying Termination Proofs: Interaction and Automation                    |
| 18:00       |         | Dinner  |  |

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Tuesday, October 6, 2009

| <i>Time</i>   | <i>Speaker</i>       | <i>Title</i>   |
|---------------|----------------------|--|
| 9:15 – 9:45   | Peter Baumgartner    | <i>Theories and First-Order Theorem Proving</i><br>Model Evolution with Built-In Theories  |
| 9:45 – 10:15  | Maria Paola Bonacina | Decision Procedures with Unsound Inferences for Software Verification  |
| 10:30 – 11:00 | Coffee Break         |  |
| 11:00 – 11:30 | Nikolaj Bjørner      | <i>Verification for Programs over Arrays</i><br>Generalized Efficient Array Decision Procedures  |
| 11:30 – 12:00 | Laura Kovacs         | Finding Loop Invariants Using a Theorem Prover   |
| 12:15 – 14:00 | Lunch                |  |
| 14:00 – 14:30 | Bernhard Beckert     | <i>Interaction and Automation in Verification and Theorem Proving</i><br>Proof Assistant vs. Extended Static Checking: The Two Faces of Program Verification |
| 14:30 – 15:00 | Claude Marché        | Combination of Automatic and Interactive Proving in Program Verification   |
| 15:00 – 15:30 | Christoph Weidenbach | Interaction vs. Automation: The Automated Theorem Proving View   |
| 15:45 – 16:30 | Coffee Break         |  |
| 16:30 – 17:00 | Thomas C. Hales      | <i>Theorem Proving for Mathematics</i><br>Inching Towards the Completion of the Flyspeck Project   |
| 17:00 – 17:30 | Freek Wiedijk        | Two Automation Challenges  |
| 18:00         | Dinner               |  |

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Wednesday, October 7, 2009

| <i>Time</i>   | <i>Speaker</i>               | <i>Title</i>   |
|---------------|------------------------------|--|
| 9:15 – 9:45   | Viorica Sofronie-Stokkermans | <i>Reasoning for Theories with Recursive Functions</i><br>Automated Reasoning in Extensions of Theories of Constructors with Recursively Defined Functions and Homomorphisms |
| 9:45 – 10:15  | Viktor Kuncak                | Deciding Function Images and Recursive Functions over Data Types by BAPA Reduction   |
| 10:30 – 11:00 | Coffee Break                 |  |
| 11:00 – 11:30 | Ulrich Furbach               | <i>Theorem Proving and Artificial Intelligence</i><br>Embedding Automated Deduction in a Question Answering System   |
| 11:30 – 12:00 | Franz Baader                 | LTL over Description Logic Axioms  |
| 12:15 – 14:00 | Lunch                        |  |
| 14:00 – 14:30 | Wolfgang Paul                | <i>Inductive Theorem Proving and Verification</i><br>System Verification in the Verisoft Project   |
| 14:30 – 15:00 | Deepak Kapur                 | Inductive Validity Revisited   |
| 15:00 – 15:30 | Coffee Break                 |  |
| 15:30 – 15:45 | Group Picture                |  |
| 15:45         | Excursion                    |  |

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Thursday, October 8, 2009

| <i>Time</i>   | <i>Speaker</i>       | <i>Title</i>  |
|---------------|----------------------|---|
| 9:15 – 9:45   | Andrey Rybalchenko   | <i>Theorem Proving for Security</i><br>Automatic Discovery and Quantification of Information Leaks          |
| 9:45 – 10:15  | Kurt Stenzel         | Interactive Verification of Application Specific Security Protocols   |
| 10:30 – 11:00 | Coffee Break         |   |
| 11:00 – 11:30 | Aaron Stump          | <i>Theorem Proving and Programming Languages</i><br>Dependently Typed Programming with Mutable State        |
| 11:30 – 12:00 | Brigitte Pientka     | Beluga: Programming with Dependent Types and Higher-Order Data  |
| 12:15 – 14:00 | Lunch                |   |
| 14:00 – 14:30 | Aart Middeldorp      | <i>Term Rewriting and Termination</i><br>Decreasing Diagrams and Relative Termination                       |
| 14:30 – 15:00 | Jürgen Giesl         | Termination of Integer Term Rewriting   |
| 15:00 – 15:30 | Peter Schneider-Kamp | The Dependency Triple Framework for Termination Analysis of Logic Programs                                  |
| 15:45 – 16:30 | Coffee Break         |   |
| 16:30 – 17:00 | Tobias Nipkow        | <i>Interaction and Automation in Proof Assistants and First-Order Provers</i><br>Sledgehammer: Judgment Day |
| 17:00 – 17:30 | Laurent Théry        | Integrating SAT and SMT into the Coq Proof Assistant  |
| 17:30 – 18:00 | Krystof Hoder        | Comparing Unification Algorithms in First-Order Theorem Proving   |
| 18:00         | Dinner               |   |

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Friday, October 9, 2009

| <i>Time</i>   | <i>Speaker</i>     | <i>Title</i>   |
|---------------|--------------------|--|
| 9:15 – 9:45   | Renate Schmidt     | <i>First-Order Theorem Proving</i><br>Automated Synthesis of Tableau Calculi   |
| 9:45 – 10:15  | Zvonimir Rakamaric | <i>Verification of Concurrent Programs</i><br>Static and Precise Detection of Concurrency Errors in Systems Code Using SMT Solvers |
| 10:30 – 11:00 | Coffee Break       |  |
| 11:00 – 11:30 | Georges Gonthier   | <i>Theorem Proving and Types</i><br>Formalized Automation  |
| 11:30 – 12:00 | Ranjit Jhala       | Software Verification using Liquid Types   |
| 12:15 – 14:00 | Lunch              |  |