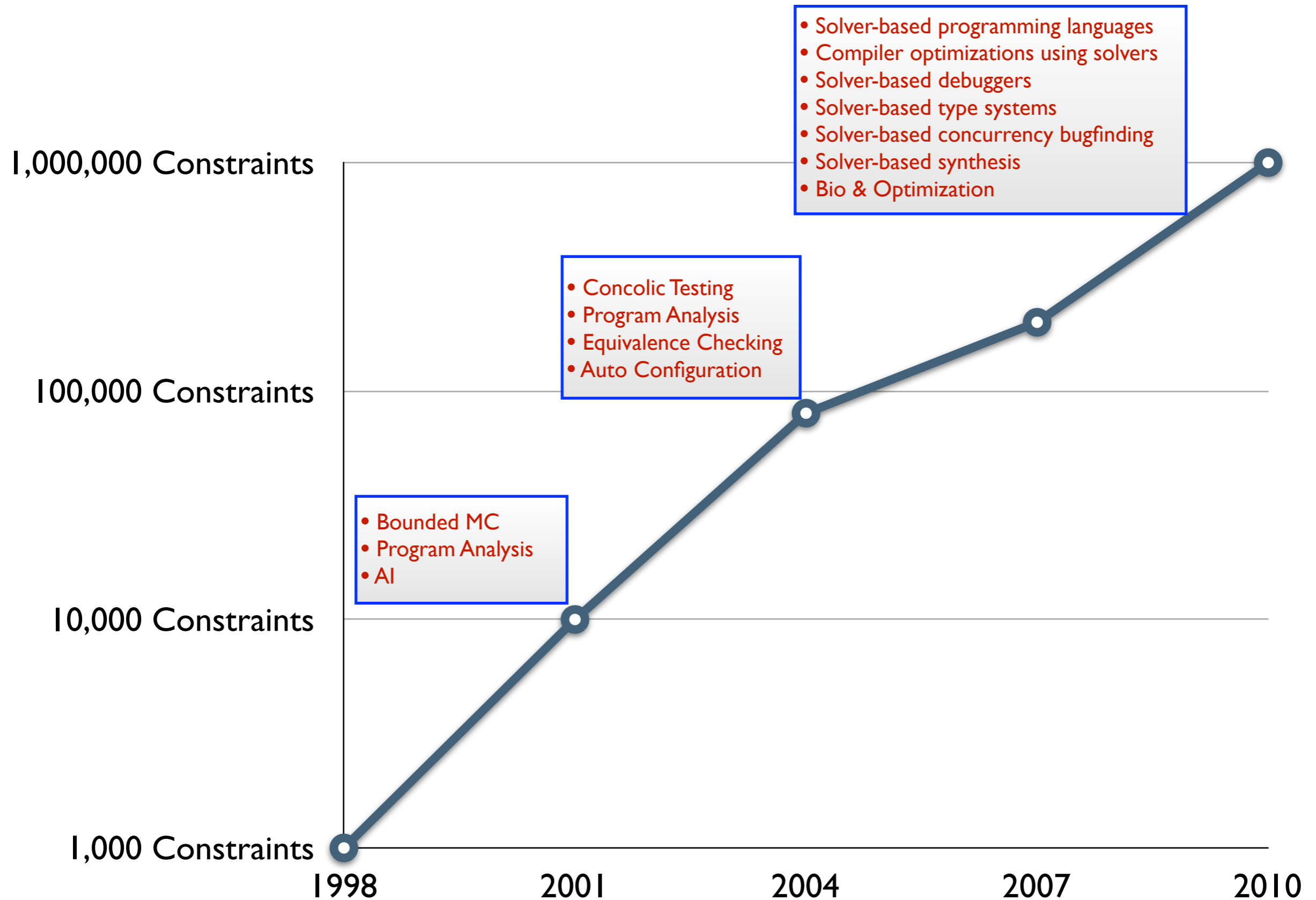


First International SAT/SMT Solver Summer School

Vijay Ganesh
MIT
June 12, 2011

SAT/SMT Solver Research Story



SAT/SMT Solver Research Story

Game Changer

- Formal methods, testing, synthesis, analysis, language design,...
- “Solving SE problem” to “Solving SE problem using SAT/SMT solvers”
- For any strategic framework, solver an indispensable tactic
- Inflection point in computing: **Multicores**
- **Future of SAT/SMT is bright**

Summer School vs. Conference

Diversity of Opinions

- Formal methods researchers to hackers
- Showcases diverse applications of solvers
- Conflict, and its resolution are essential for progress
- Educate, Inspire, Evangelize

Topics

SAT, SMT, Apps, AI, Theory

- Core SAT solver talks
 - Niklas Een (Berkeley) talk on MiniSAT
 - Sharad Malik (Princeton), Karem Sakallah (U. Mich) and Joao Marques-Silva (UC Dublin)
 - Youssef Hamadi (MSR Cambridge) talk on Parallel SAT
 - Carla Gomes & Bart Selman (Cornell) talk on stochastic local search-based SAT
 - Mate Soos talk on CryptoMiniSAT, and SAT apps in cryptography

Topics

SAT, SMT, Apps, AI, Theory

- Core SMT solver talks
 - Alberto Oliveras (UPC) talk on DPLL(T) and SMT Theory
 - Leonardo DeMoura & Nikolaj Bjorner (Microsoft Research) talk on SMT implementation
 - Cesare Tinelli (U. Iowa) talk on SMTLIB initiative

Topics

SAT, SMT, Apps, AI, Theory

- SMT solvers with focus on apps
 - Clark Barrett (NYU) talk on CVC3
 - Bruno Dutertre (SRI International) talk on Yices
 - Alessandro Cimatti (U.Trento) talk on MathSAT
 - Roberto Brutomesso & Natasha Sharygina (USI) talk on OpenSMT
 - Sanjit Seshia (UCB) & Randy Bryant (CMU) talk on UCLID (eager with approximations)
 - Emina Torlak (LogicBlox) talk on Kodkod/Alloy (eager)
 - Vijay Ganesh (MIT) talk on HAMPI: Solver for String Theories

Topics

SAT, SMT, Apps, AI, Theory

- SAT Apps Talks
 - Ed Clarke (CMU) talk on SAT for formal verification
 - Sharad Malik (Princeton) talk on SAT in software debugging and backbones
 - Karem Sakallah (UMich) talk on SAT in CEGAR flow for microprocessor verification
 - Joao Marques-Silva (UC Dublin) talk on SAT for optimization problems over Booleans
 - Armin Biere (Johannes Kepler U.) talk on SAT-based model-checking
 - Daniel Le Berre (Université d'Artois) talk on SAT4J: Pseudo-boolean optimizations
 - Armando Solar-Lezama (MIT) talk on Sketching: SAT-based program synthesis

Topics

SAT, SMT, Apps, AI, Theory

- SMT Apps Talks
 - Cristian Cadar (Imperial) talk on the Klee dynamic symbolic testing tool
 - Stephen McCamant (UCB) talk on Bitblaze and Webblaze security analysis systems
 - Lahiri & Qadeer (MSR) talk on HAVOC: precise and scalable program analysis
 - Candea & Bucur (EPFL) talk on S2E: Scalable, parallel, selective symbolic execution
 - Godefroid & Molnar (MSR) talk on SAGE: Automated whitebox fuzzing using SMT

Topics

SAT, SMT, Apps, AI, Theory

- SMT Apps Talks
 - Rustan Leino (Microsoft Research) talk on Boogie: An SMT-based verification engine
 - Ranjit Jhala (UCSD) talk on SMT solver-based type systems
 - Sorin Lerner (UCSD) talk on SMT solver-based compiler optimizations
 - Ruzica Piskac (EPFL) talk on SMT solver-based synthesis
 - Davidy Brumley (CMU) talk on Symbolic Execution and Automated Exploit Generation

Topics

SAT, SMT, Apps, AI, Theory

- AI and Theory talks
 - Henry Kautz (Rochester) talk on SAT solving in AI
 - Ryan Williams (IBM) talk on complexity theoretic aspects of the Boolean SAT problem
 - Shai Ben-David (U. Waterloo) talk on Independence results for the P vs. NP question
 - Sam Buss (UCSD) talk on Proof complexity and SAT

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- Vicky Palay of MIT CSAIL Admin
- Renee Howe, MIT schedules office

Logistics

Class Timings, Lunch/Breaks, MIT facilities

- 8:30 AM to 6 PM (35 lectures). Each Lecture 1/1.15 hour
- Coffee + Pastries: morning and afternoon
- Lunch: 12:30 - 2:00 PM at Student Center (W20) 2nd floor (<http://whereis.mit.edu>)
- Please sign the attendance sheet
- Power cables provided in classroom. Return after use
- MIT wifi: sign-in as visitor
- Volunteers: Artur Dmowski, Hank Hoffman, Mary McDavitt, George Rossick, Joe Near, Mike Carbin, Vijay Ganesh



Thanks & Welcome Again!!

<http://people.csail.mit.edu/vganesh/summerschool>