YAN CHEN

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Research Interests

- Self-adjusting computation, Program analysis, Dynamic algorithms
- Formal methods, Model checking, Symbolic execution

Education

- Ph.D. student, Computer Science, Toyota Technological Institute, Chicago, IL   *2008 – Present*
  Working on programming languages, and self-adjusting computation
    Adviser: Umut Acar
- M.S., Computer Science, Portland State University, Portland, OR   *August 2008*
    Thesis: Equivalence Checking for High-Level Synthesis Flow
- B.E., Computer Science and Technology, Fuzhou University, China   *June 2006*

Publications

1. Matthew A. Hammer, Umut A. Acar, and **Yan Chen**. CEAL: A C-Based Language for Self-Adjusting Computation. *Proc. of ACM-SIGPLAN Conference on Programming Language Design and Implementation (**PLDI**)*, 25–37, Jun 2009. *Acceptance Ratio:* 20%

2. Sandip Ray, Kecheng Hao, **Yan Chen**, Fei Xie, and Jin Yang. Formal Verification for High-Assurance Behavioral Synthesis. *Proc. of 7th International Symposium on Automated Technology for Verification and Analysis (**ATVA**)*, Oct 2009. *Acceptance Ratio:* 30%

3. **Yan Chen**, Fei Xie, and Jin Yang. Optimizing Automatic Abstraction Refinement for GSTE. *Proc. of 45th Design Automation Conference (**DAC**)*, 143–148, Jun 2008. *Acceptance Ratio:* 23%

4. **Yan Chen**, Yujing He, Fei Xie, and Jin Yang. Automatic Abstraction Refinement for Generalized Symbolic Trajectory Evaluation. *Proc. of 7th International Conference on Formal Methods in Computer-Aided Design (**FMCAD**)* , 111–118, Nov 2007. *Acceptance Ratio:* 28%

5. **Yan Chen**. An Efficient Search Algorithm for Partially Ordered Sets. *Proc. of The IASTED International Conference on Advances in Computer Science and Technology (**ACST**)*, 91–94, Jan 2006.

Technical Reports

1. Matthew A. Hammer, Umut A. Acar, and **Yan Chen**. CEAL: A C-Based Language for Self-Adjusting Computation. Technical Report TTIC-TR-2009-2. Toyota Technological Institute at Chicago. May 2009.

2. Sandip Ray, **Yan Chen**, Fei Xie, and Jin Yang. Combining Theorem Proving and Model Checking for Certification of Behavioral Synthesis Flows. Technical Report TR-08-48, Department of Computer Science, University of Texas at Austin. Dec 2008.

Awards

- Google GRAD CS Forum, 01/2010.
- **Silver Medal** (12th Place), 30th ACM International Collegiate Programming Contest (ICPC). Beijing Site, 11/2005.
- **Third Prize**, National Undergraduate Electronic Design Contest Specialized in Embedded System. 09/2004.
- **Second Prize** (for three continuous years), National Olympiad in Informatics Provincial Contest. 1999 – 2001.

Professional Services

- Reviewer for ACM SIGPLAN International Conference on Functional Programming. 2010.
- Reviewer for ACM SIGPLAN workshop on ML. 2009.
- Reviewer for ACM/IEEE International Conference on Formal Methods and Models for Codesign (MEMOCODE). 2008, 2009.
- Reviewer for ACM Symposium on Applied Computing (SAC). 2008.
- Reviewer for Journal of Information and Software Technology (JIST). 2008.
- Organizer and Judge. Annual Programming Contest in Fuzhou University. 2004 – 2006.
- Assistant Coach. ACM/ICPC World Final 2006 Team of Fuzhou University. 2005 – 2006.

Professional Experience

- Ph.D. student at Toyota Technological Institute at Chicago   *09/2008 – Present*
  Visiting the Max-Planck Institute for Software Systems, Kaiserslautern, Germany

  - ★ **Compiler for Delta ML**. Adding a source-to-source translation to Delta ML compiler, an ML-based language for self-adjusting computation based on MLton. The translation can automatically translate a normal ML program into a Delta ML program, such that the program can response to data changes efficiently without modifying code.

- Master student at Portland State University   *09/2006 – 08/2008*

  - ★ **Automatic Abstraction Refinement for Generalized Symbolic Trajectory Evaluation**. A comprehensive approach to automatic abstraction refinement for GSTE. It eliminates all the false negatives caused by quaternary abstraction, and is able to quickly converge to an abstraction upon which GSTE can either verify or falsify an assertion graph.

  - ★ **Equivalence Checking for High-Level Synthesis Flow**. Formalized clocked control and data flow diagram (CCDFG) that is amenable to both theorem proving and model checking. Conducted equivalence checking between CCDFG and synthesized circuit using word-level abstraction and symbolic execution. The approach makes use of the intermediate result from the synthesis flow to greatly improve the model checking efficiency.

- Projects at Fuzhou University   *09/2002 – 06/2006*

  - ★ **Greedy Snake Solver**. Applied genetic programming to guide computers learn to play Greedy Snake game. After evolving 50 generations, the solver can eat more than 40% of the food.

  - ★ **Intelligent Home on Embedded System**. An embedded system that controls all the electronic devices at home by learning user habits. This is a team-work project developed under Intel PXA255 (Sitsang) platform. I was in charge of the web service and the data mining system.

★ **Fuzhou University Online Judge System**. A secure sand-box to execute untrusted binary programs. The system allocates the memory and CPU time, exams all the system calls inside the sand-box to ensure safe behavior of the program. The associated website (http://acm.fzu.edu.cn) is one of the earliest and biggest online judge systems in China.

Presentations

- "Optimizing Automatic Abstraction Refinement for GSTE". *Design Automation Conference (DAC)*. Anaheim, California. Jun 10, 2008.

- "Optimizing Automatic Abstraction Refinement for GSTE". *Progress report to Strategic CAD Lab at Intel*, Portland, Oregon. Apr 7, 2008.

- "Proving Correctness of Computer Systems". *Toyota Technological Institute at Chicago*, Chicago, Illinois. Apr 4, 2008.

- "Automatic Abstraction Refinement for GSTE". *International Conference on Formal Methods in Computer-Aided Design (FMCAD)*. Austin, Taxes. Nov 13, 2007.

- "Automatic Abstraction Refinement for GSTE". *Progress report to Strategic CAD Lab at Intel*. Portland, Oregon. Jun 15, 2007.

- "An Efficient Search Algorithm for Ordered Structures". *IASC Asian Conference on Statistical Computing*. The University of Hong Kong, Hong Kong SAR. Dec 17, 2005.

- "An Optimal Algorithm for Constructing Accurate Implication Sets". *National Combinatorial Optimization Conference*. Zhejiang University, Hangzhou, China. Mar 2004.

Skills and Strength

★ Highly-Proficient Languages: C, ML

★ Proficient Languages: Coq, Prolog, Forte, Pascal, SQL, ASP/PHP, LaTeX

References

Available upon request