

Oksana Tkachuk

Curriculum Vitae

Research Scientist	Phone: (408) 530-4616
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Research Interests

Formal methods in software engineering, **software specification and verification**: model checking, static analysis, symbolic execution, dynamic analysis, modular verification, environment and test case generation.

Research Experience

- 9/2005 – present** Research Scientist, Trusted Systems Innovation Group, **Fujitsu Laboratories of America**, Current project: automated environment generation techniques for model checking commercial software.
- 9/99 – 8/2005** Research Assistant, Department of Computing and Information Sciences, Kansas State University, Advisor: M.B. Dwyer. Developed the *Bandera Environment Generator (BEG)*, a framework for automatically closing open systems by modeling their environment. BEG generates environment drivers and stubs based on environment specifications and static analysis of environment implementation.
- 6/03 – 8/03** Research Intern, **NASA Ames Research Center**, Automated Software Engineering Group, Advisor: G. Brat. As part of the *Formal Analysis of Human-Automation Interaction* project, improved a framework for model checking specialized GUI programs to allow for property-preserving modeling of the GUI components.
- 6/02 – 8/02** Research Intern, **NASA Ames Research Center**, Automated Software Engineering Group, Advisor: G. Brat. As part of an empirical study for evaluation and comparison of software analysis tools, evaluated *PolySpace* static analyzer on the NASA Mars Rover software. As part of the *Formal Analysis of Human-Automation Interaction* project, built a framework for extracting and pruning Situation-Goal-Action tables from aviation software modules.
- 6/01 – 8/01** Research Intern, **NASA Ames Research Center**, Automated Software Engineering Group, Advisor: W. Visser. As part of the *Formal Analysis of Human-Automation Interaction* project, identified mode confusion problems in the NASA web-based tutor used for the MD-11 autopilot simulation. Applied techniques included automated stub generation for GUI components, specification of the pilot's tasks and expectations, and verification using the Java PathFinder model checker.

Education

Ph.D. Computer Science, 2008, *Kansas State University*.

Thesis Title: **Domain-Specific Environment Generation for Modular Software Model Checking.**

Advisor: M.B. Dwyer.

M.S. Computer Science, 2003, *Kansas State University*.

Thesis Title: **Adapting Side-Effects Analysis for Modular Program Model Checking.**

Advisor: M.B. Dwyer.

Refereed Publications

- O. Tkachuk, M. B. Dwyer. Environment Generation for Validating Event-Driven Software Using Model Checking. In *IET Software Journal*, June 2010.
- S. Rajan, O. Tkachuk, M. Prasad, I. Ghosh, N. Goel, T. Uehara. WEAVE: WEb Applications Validation Environment. In *Proceedings of the 31st International Conference on Software Engineering (ICSE), Vol 2, SE in Practice*, pages 101-111, Vancouver, Canada, May 2009.
- O. Tkachuk, S. Rajan. Combining Environment Generation and Slicing for Modular Software Model Checking. In *Proceedings of the 22nd IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pages 401-404, Atlanta, Georgia, USA, 2007.
- O. Tkachuk, S. Rajan. Application of Automated Environment Generation to Commercial Software. In *Proceedings of the International Symposium on Software Testing and Analysis (ISSTA)*, pages 203-214, Portland, Maine, USA, July 2006.
- M.B. Dwyer, Robby, O. Tkachuk, W. Visser. Analyzing Interaction Orderings with Model Checking. In *Proceedings of the 19th IEEE International Conference on Automated Software Engineering (ASE)*, pages 154-163, Linz, Austria, September 2004.
- O. Tkachuk, M.B. Dwyer, C. Pasareanu. Automated Environment Generation for Software Model Checking. In *Proceedings of the 18th IEEE International Conference on Automated Software Engineering (ASE)*, pages 116-127, Montreal, Canada, October 2003.
- O. Tkachuk, M.B. Dwyer. Adapting Side-Effects Analysis for Modular Model Checking. In *Proceedings of the Joint 9th European Software Engineering Conference (ESEC) and 11th SIGSOFT Symposium on the Foundations of Software Engineering (FSE)*, pages 188-197, Helsinki, Finland, September 2003.
- O. Tkachuk, G. Brat, W. Visser. Using Code Level Model Checking to Discover Automation Surprises. In *Proceedings of the 21st Digital Avionics Systems Conference (DASC)*, Irvine, California, October 2002.

Awards

Fujitsu Laboratories Ltd. President's Award for Innovation, 2008

References

Available upon request.