

# Oksana Tkachuk

## Curriculum Vitae

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Research Engineer  
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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

**01/2011 – present** Research Engineer, **SGT, Inc.**, Robust Software Engineering Group, **NASA Ames Research Center**, project: verification of safety-critical software.

**9/2005 – 01/2011** Research Scientist, Trusted Systems Innovation Group, **Fujitsu Laboratories of America**. Led a project on 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

- W. Luks, O. Tkachuk, D. Bushnell. Automatic Extraction of JPF Options and Documentation. In *JPF Workshop*, Lawrence, Kansas, USA, November 2011.
- P. Mehrlitz, O. Tkachuk, M. Ujma. JPF-AWT: Model checking GUI applications. In *Proceedings of the 26th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pages 584-587, Lawrence, Kansas, USA, November 2011.
- O. Tkachuk, S. P. Rajan. Automated Driver Generation for Analysis of Web Applications. In *Proceedings of Fundamental Approaches to Software Engineering (FASE)*, pages 326-340, Saarbrucken, Germany, April 2011.
- O. Tkachuk, M. B. Dwyer. Environment Generation for Validating Event-Driven Software Using Model Checking. In *IET Software Journal*, June 2010.
- S. P. 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. P. 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, November 2007.
- O. Tkachuk, S. P. 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

## **Patents**

S. P. Rajan, O. Tkachuk, M. Prasad, I. Ghosh, System and method for detecting software defects, U.S. Patent No. 7,685,471, March 23, 2010. (Assignee: Fujitsu Ltd.)

## **References**

Available upon request.