

ALMA L. JUAREZ DOMINGUEZ

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CONTACT INFORMATION

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EDUCATION

- 05/2005–04/2012: **PhD in Computer Science**, Supervisor: Dr. Nancy A. Day
University of Waterloo, Waterloo, Canada
- Thesis Title: “Detection of Feature Interactions in Automotive Active Safety Features”
This work characterizes and detects unsafe situations, called feature interactions, that arise when embedded components of a vehicle cause undesired or unexpected system behavior. For example, simultaneous requests of sharp steering and throttle from active safety automotive features can cause the vehicle to roll over. This work develops techniques and tools to identify and detect all potential feature interactions for automotive features at design time, allowing for domain experts to assign an appropriate resolution.
- 09/2002–04/2005: **Master’s degree in Computer Science**, Supervisor: Dr. Nancy A. Day
University of Waterloo, Waterloo, Canada
- Thesis Title: “Verification of the DFC Call Protocol Correctness Criteria”
- 09/1995–08/2000: **B.Sc. in Computer Science**, GPA: 9.51/10
Benemérita Universidad Autónoma de Puebla, México
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RESEARCH INTERESTS

- Software engineering, particularly the use of formal methods in the development of theories and techniques for the automated analysis and verification of critical software-intensive systems, but also program verification, modelling and model-driven engineering, static analysis, testing and system safety analysis.
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RESEARCH EXPERIENCE

- 08/2012–present: **Independent Consultant**, assisting clients with the specification, analysis, verification and documentation of their products in accordance with applicable industry standards.
- 05/2012–present: **Postdoctoral Fellow** (part-time) with the Network for the Engineering of Complex Software-Intensive Systems for Automotive Systems (NECSIS) project, University of Waterloo. Work on techniques for effective identification of safety risks, and extension of tools for analysis.
- 05/2005–04/2012: **Research Assistant**, University of Waterloo. Developed techniques and tools for detection of feature interactions in automotive embedded systems at design time.
- 09/2006–08/2008: **Research Associate** for Critical Systems Labs Inc. Worked on a project that involved General Motors Canada, developing techniques and tools for the automated analysis and verification of safety-critical requirements in complex software-intensive systems.
- 09/2003–04/2005: **Research Assistant** with the CITO project “Managing Feature Interactions among Distributed Services”, sponsored by AT&T.
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PROFESSIONAL DEVELOPMENT

- 08/2010–09/2010: **Courses attended:** “Software Safety Evidence”, “ISO/DIS 26262 - Functional Safety Draft International Standard for Road Vehicles”, “Introduction to Human Factors and System Safety”, “Introduction to Software Safety”, 28th Int’l Sys. Safety Conf., USA.
- 12/2009: **Certificate in University Teaching** (CUT) from the Centre for Teaching Excellence, University of Waterloo, Canada.
- 08/2008: **Course attended:** “STAMP and STPA: A New Approach to System Safety for Complex, High-Tech Systems”, 26th Int’l Sys. Safety Conf., USA.
- 08/2006: **Selected Participant** of the 27th International Summer School on “Software System Reliability and Security”, Marktoberdorf, Germany.

 REFEREED PUBLICATIONS

- 05/2013: A. L. Juarez Dominguez, B. G. Partridge, J. J. Joyce. *Creating Safety Assurance Cases for Rebreather Systems*. Proc. of the Workshop on Assurance Cases for Software-intensive Systems of the 35th Int'l Conf. on Software Engineering. (*In press*)
- 09/2008: A. L. Juarez Dominguez. *Feature Interaction Detection in the Automotive Domain*. Proc. of the Doctoral Symposium of the 23rd IEEE/ACM Int'l Conf. on Automated Software Engineering.
- 08/2008: A. L. Juarez Dominguez, N. A. Day, R. T. Fanson. *Translating Models of Automotive Features In MATLAB's Stateflow to SMV to Detect Feature Interactions*. Proc. of the 26th Int'l Sys. Safety Conf.
- 05/2008: A. L. Juarez Dominguez, N. A. Day, J. J. Joyce. *Modelling Feature Interactions in the Automotive Domain*. Proc. of the Workshop on Modeling in Software Engineering of the 30th Int'l Conf. on Software Engineering.
- 08/2007: A. L. Juarez Dominguez, J. J. Joyce, R. Debouk. *Feature Interaction as a Source of Risk in Complex Software-intensive Systems*. Proc. of the 25th Int'l Sys. Safety Conf.
- 06/2005: A. L. Juarez Dominguez, N. A. Day. *Compositional Reasoning for Port-based Distributed Systems*. Proc. of the 20th IEEE/ACM Int'l Conf. on Automated Software Engineering. (short paper, acceptance rate: 22%).

 PUBLICATIONS IN PREPARATION

- 05/2013: A. L. Juarez Dominguez, N. A. Day. *Using Model Checking to Find Multiple Diverse Counterexamples to an Invariant of an EFSM*. IEEE Transactions of Software Engineering. (*Journal in preparation*)

 NON-REFEREED PUBLICATIONS

- 12/2012: A. L. Juarez Dominguez, N. A. Day. *smv-morph: Working with Cadence SMV models in Moscow ML*, University of Waterloo. Technical Report CS-2012-24.
- 04/2010: A. L. Juarez Dominguez, N. A. Day. *On-the-fly Counterexample Abstraction for Model Checking Invariants*, University of Waterloo. Technical Report CS-2010-11.
- 12/2007: A. L. Juarez Dominguez, N. A. Day, R. Fanson. *A Preliminary Report on Tool Support and Methodology for Feature Interaction Detection*, University of Waterloo. Technical Report CS-2007-44.
- 04/2004: A. L. Juarez Dominguez, W. Godard, N. A. Day. *Model Checking the Distributed Feature Composition Architecture (DFC) in Spin*, University of Waterloo. Technical Report CS-2004-40.

 INVITED AND CONTRIBUTED TALKS

- 04/2012: *Detection of Feature Interactions in Automotive Active Safety Features*, University of Waterloo.
- 04/2011: *Detecting and Representing the Complete set of Counterexamples to an Invariant for an EFSM*, University of Waterloo.
- 12/2010: *Automatic Detection of Feature Interactions in the Automotive Domain*, University of Waterloo.
- 06/2009: *Overview of the Counterexample Explosion Problem*, Critical Systems Labs Inc. Vancouver, Canada.
- 06/2009: *Modelling for Feature Interaction Detection in the Automotive Domain*, University of British Columbia.
- 10/2008: *mdl2smv: A Tool for Translating Automotive Feature Models in Matlab's Stateflow to SMV*, University of Waterloo.
- 09/2008: *Feature Interaction Detection in the Automotive Domain*, Doctoral Symposium at the 23rd ASE.
- 08/2008: *Feature Interaction as a Source of Risk in Complex Software-Intensive Systems*, for the group developing a proposed ISO standard 26262 for Functional Safety of Electronic Control Systems in Road Vehicles. Vancouver, Canada.
- 08/2008: *Translating Models of Automotive Features In MATLAB's Stateflow to SMV to Detect Feature Interactions*, 26th ISSC.
- 05/2008: *Modelling Feature Interactions in the Automotive Domain*, MiSE Workshop at the 30th ICSE.
- 04/2008: *Modelling Feature Interactions in the Automotive Domain*, University of Waterloo.
- 02/2008: *Tool Support and Methodology for Feature Interaction Detection*, General Motors Research and Development. Warren, USA.
- 08/2007: *A Compositional Reasoning Method for the Verification of Port-based Distributed Systems*, University

of British Columbia.

08/2007: *Feature Interaction as a Source of Risk in Complex Software-intensive Systems*, 25th ISSC.

01/2007: *Tool Assisted Feature Interaction Detection for Automotive Features*, General Motors Research and Development. Warren, USA.

05/2005: *Verification of the DFC Port Protocol Correctness Criteria*, University of Waterloo.

TEACHING EXPERIENCE

- 10/2009: **Invited Lecturer** for ECE-725/CS-745 (Computer Aided Verification), University of Waterloo. Graduate lecture on: “SMV: Symbolic Model Verifier”. Introduced key concepts; Explained multiple examples.
- 05/2007–12/2007: **Co-supervisor** for Richard Fanson, University of Waterloo. Guided the creation of automotive features designed in Stateflow and the first version of a tool to translate models in Stateflow into the SMV language; Lead in the acquisition of problem solving skills.
- 03/2006: **Invited Lecturer** for ECE-725/CS-745 (Computer Aided Verification), University of Waterloo. Lecture on advanced topic: “Compositional Reasoning Methods”; Created lecture notes; Explained detailed material; Introduced multiple examples.
- 05/2006–08/2006: **Teaching Assistant** for CS246 (Software Abstraction and Specification), University of Waterloo. Revised course material; Marked assignments and exams.
- 01/2006–04/2006: **Teaching Assistant** for CS245 (Logic and Computation), University of Waterloo. Revised course material; Marked assignments and exams.
- 09/2005–12/2005: **Teaching Assistant** for CS445/ECE451 (Software Requirements and Specification), University of Waterloo. Guided and corrected group projects; Lead walkthroughs for projects.
- 05/2005–08/2005: **Teaching Assistant** for CS251 (Digital Design), University of Waterloo. Presented tutorials; Revised material; Marked assignments and exams.
- 12/2004: **Invited Lecturer** for CS-745 (Computer Aided Verification), University of Waterloo. Lecture on advanced topic: “Protocol Correctness Criteria”; Created lecture notes, examples.
- 05/2004–08/2004: **Co-supervisor** for Wenceslas Godard, University of Waterloo. Guided the creation of telephony features, used in the identification of correctness criteria for the Distributed Feature Composition (DFC) architecture, developed by Jackson and Zave at AT&T.
- 09/2003–12/2003: **Teaching Assistant** for CS245 (Logic and Computation), University of Waterloo. Revised course material; Marked assignments and exams; Lead tutorials.

LEADERSHIP ACTIVITIES

- 11/2011: **Panelist** for University Teaching Services, *University of Manitoba*. Participated in the panel “Reflections of teaching/learning in the International Classroom” during the Intercultural Education Week. Topics: Teaching/learning observations and strategies.
- 2/2011 : **Panelist** for Women in Computer Science, *University of Waterloo*. Participated in the “Experience in Industry” Session. Topics: Industrial scholarships and experience.
- 10/2010: **Panelist and Author** in the Birds of a Feather session “Minorities without Borders: Giving Back to Developing Countries” for the Grace Hopper Celebration 2010.
- 05/2010 & 05/2009: **Instructor** for the course “Introduction to Programming” for the CEMC Seminar in Computer Science for Young Women, University of Waterloo. Lead the programming course for selected high school school female students from across Canada.
- 04/2010 : **Panelist** for Women in Engineering, University of Toronto. Participated in the “Diversity in Graduate School” CRA-W panel. Topics: graduate research and life, career opportunities, role models (underrepresented minorities).
- 12/2008 : **Panelist** for Women in Computer Science, University of Waterloo. Participated in the “Supervising Graduate Students” Information Session. Topics: styles of supervision, supervisor-student relationship, and handling problems with supervisor. item[01/2008]
Panelist for Women in Math, *University of Waterloo*. Participated in the “Grad School Diaries” Session for female undergraduate students in the Math department. Topics: graduate research, career development and opportunities, life-work balance.

- 01/2007 – 04/2007: **Mentor** in the Women in Math program, *University of Waterloo*. Guided first-year female undergraduate students on career and personal development.
- 03/2005 : **Panelist** in the Women in Math Day, University of Waterloo. Lead one of the “Grad student research panel” Session. Topics: graduate research and life, career opportunities.
- 06/2004 & 05/2004: **Instructor** for the session “Parallel Computing: Sorting” in the Imperial Oil Seminars in Computer Science for Young Women, University of Waterloo. Created materials and guided activities to explain sequential and parallel sorting algorithms.

SCHOLARSHIPS AND AWARDS

- 09/2010: **Google Hispanic Network Donation** to attend the Grace Hopper Conference 2010.
- 07/2009: **Google Women of Color Scholarship** to attend the Grace Hopper Conference 2009.
- 10/2008: **Google Canada Anita Borg Memorial Scholarship Finalist**, \$1,000CAD, Google.
- 08/2008: **Scientific Research and Development of the Year Award**. The International System Safety Society selected the Waterloo/GM (University of Waterloo and General Motors) Team as the recipient of the award in 2008.
- 05/2007–04/2009: **Cheriton Scholarship**, \$10,000CAD/year. The David R. Cheriton School of Computer Science at the University of Waterloo, Canada.
- 01/2007–12/2008: **NSERC Industrial Postgraduate Scholarship (IPS)**, \$21,000CAD/year. The Natural Sciences and Engineering Research Council of Canada (NSERC) in collaboration with the co-sponsoring companies General Motors Canada and Critical Systems Labs, Canada.
- 05/2006–12/2007: **International Graduate Student Doctoral Award**, \$8,400CAD/year. The University of Waterloo, Canada.
- 09/2002–08/2004: **‘Formación de Científicos y Tecnólogos’ Scholarship**, \$28,925CAD/year. The Consejo Nacional de Ciencia y Tecnología (CONACYT), Mexico.
- 09/1996–08/2000: **Excellent Student Award**
The Benemérita Universidad Autónoma de Puebla (BUAP) gives this award to people with an overall average grade of at least 95%.

ADDITIONAL INFORMATION

- Canadian citizen, Mexican citizen

COMPUTER LITERACY

- Environments: WINDOWS, LINUX, MAC OS X, Other Unixes
- Programming: Declarative (C, Fortran), Parallel (MPI, PVM), Functional (ML, Lisp), Logic (Prolog), Object Oriented (C++, Java), Scripting (Perl, Tcl/Tk)
- Other Programs: Modelling (MATLAB’s Stateflow), Model Checkers (SMV, SPIN), Theorem Provers (HOL)
- Typesetting: HTML, CSS (Cascading Style Sheets), L^AT_EX, B_IB_TE_X, MS Word

REFERENCES

These persons are familiar with my professional qualifications and my character:

Dr. Nancy A. Day

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