Carolina Ruiz
Curriculum Vitae

December 1995

Department of Computer Science
University of Maryland
College Park, MD 20742
U. S. A.

Phone: (301) 405–2716
Fax: (301) 405–6707
e-mail: cruizc@cs.umd.edu
URL=http://www.cs.umd.edu/~cruizc/

Education

Ph.D. in Computer Science. expected May 1996
University of Maryland at College Park.

MS in Computer Science. 1990
University of Los Andes. Bogotá, Colombia.

BS in Mathematics. 1989
University of Los Andes. Bogotá, Colombia.

BS (5 year degree) in Computer Science. 1988
University of Los Andes. Bogotá, Colombia.

Current Position

Graduate Research Assistant. Since 1992
Department of Computer Science and
Institute for Advanced Computer Studies (UMIACS).
University of Maryland at College Park.

Research Interests

- applications of mathematical logic to knowledge representation and reasoning
- deductive databases
- logic programming
- computational complexity
- non-monotonic reasoning
- non-classical logics
- proof theory
- automated theorem proving

Current Research

I introduce and investigate formalisms that admit several forms of default negation which interact with each other and with classical (or "explicit") negation in the same knowledge based system. Some theoretical aspects of this research include the investigation of the expressive power of the new formalisms and the characterization of their semantics. Practical issues include implementing procedures to compute in these formalisms, calculating the computational complexity of different reasoning tasks under the proposed semantics and modeling real life applications. One example is the problem of merging several knowledge bases, each of which uses a different rule for negation, and finding answers to queries in the combined knowledge base.

Previous Research/Development Projects

Categorical Logic. Showed that the category $\mathrm{Dyn}(\Sigma)$ of automata and dynamorphisms over an alphabet Σ, and of the category $\mathrm{MooreMch}(\Sigma)$ of Moore automata and Moore dynamorphisms over Σ are presheaf topoi, and investigated their exponentials and subobject classifiers. Constructed free automata and free Moore automata over sets by respectively using the left adjoints of the forgetful functors from $\mathrm{Dyn}(\Sigma)$ and $\mathrm{MooreMch}(\Sigma)$ into the category of sets (which assign to each automaton or Moore automaton its set of states). Proved that each regular language over Σ corresponds to the evaluation of the characteristic morphism associated with the inclusion of the empty subautomaton at the initial state of the accepting automaton.

Formal Verification of Abstract Data Types and Code Synthesis. Designed and developed an environment for the definition and manipulation of Abstract Data Types (ADTs), which provides a code synthesizer that automatically generates code in LISP and/or C which structurally and functionally implements an ADT. This code may be used in common applications. The environment includes also a theorem prover oriented to perform formal verification of ADTs as well as proving abstract properties of ADTs. It uses rewriting rules to produce and deal with canonical forms of ADT expressions.

Theorem Proving. Developed an implementation of the well-known theorem prover of R. Boyer and J.S. Moore characterized by allowing the definition of inductive objects and recursive functions, and using induction on well-founded orders as an essential part of theorem proving itself.

Publications

- **Book Chapters**

[1] C. Ruiz and J. Minker. Computing stable and partial stable models of extended disjunctive logic programs. In J. Dix, L.M. Pereira, and T.C. Przymusinski, editors, *Nonmonotonic Extensions of Logic Programming*, pages 205–229. Lecture Notes in Computer Science 927. Springer-Verlag, 1995.

- **Research Articles in Journals**

[1] J. Minker and C. Ruiz. Semantics for disjunctive logic programs with explicit and default negation. *Fundamenta Informaticae*, 20(3/4):145–192, 1994. Anniversary Issue edited by H. Rasiowa.

[2] D. Seipel, J. Minker, and C. Ruiz. Model generation and state generation for disjunctive logic programs. *Submitted for publication to the Journal of Logic Programming*, 1995.

- **Research Articles in Conference Proceedings**

[1] J. Minker and C. Ruiz. Mixing a default rule with stable negation. In *Proceedings of the Fourth International Symposium on Artificial Intelligence and Mathematics*, Jan. 1996.

[2] J. Minker and C. Ruiz. On extended disjunctive logic programs. In J. Komorowski and Z.W. Raś, editors, *Proceedings of the Seventh International Symposium on Methodologies for Intelligent Systems, ISMIS'93*, pages 1–18. Lecture Notes in AI. Springer-Verlag, June 1993. (Invited Paper).

- **Theses**

[1] C. Ruiz. *Semantics of Knowledge Based Systems with Multiple Forms of Negation.* PhD thesis, Department of Computer Science. University of Maryland., College Park, MD 20742 USA, 1996. (In Preparation).

[2] C. Ruiz. Manta 2: An abstract data types manager. Master's thesis, Department of Computer Science. University of Los Andes. Bogotá, Colombia, 1990. (In Spanish).

[3] C. Ruiz. Automata topoi. BS Thesis. Department of Mathematics. University of Los Andes. Bogotá, Colombia, 1989. (In Spanish).

[4] C. Ruiz. An implementation of the Boyer and Moore theorem prover. BS Thesis. Department of Computer Science. University of Los Andes. Bogotá, Colombia, 1988. (In Spanish).

- **In Preparation**

[1] J. Minker and C. Ruiz. Disjunctive logic programs with several types of negation. (In Preparation), 1996.

[2] D. Seipel, J. Minker, and C. Ruiz. A modified disjunctive well-founded semantics. (In Preparation), 1996.

- **Technical Reports**

[1] D. Seipel, J. Minker, and C. Ruiz. Model generation and state generation for disjunctive logic programs. Technical Report CS-TR-3546 UMIACS-TR-95-99, Dept. of Computer Science and Institute for Advanced Computer Studies. University of Maryland, College Park, MD 20742. USA, 1995.

[2] C. Ruiz and J. Minker. Computing stable and partial stable models of extended disjunctive logic programs. Technical Report CS-TR-3458 UMIACS-TR-95-49, Dept. of Computer Science and Institute for Advanced Computer Studies. University of Maryland, College Park, MD 20742. USA, 1995.

[3] J. Minker and C. Ruiz. Semantics for disjunctive logic programs with explicit and default negation. Technical Report CS-TR-3160 UMIACS-TR-93-107, Dept. of Computer Science and Institute for Advanced Computer Studies. University of Maryland, College Park, MD 20742. USA, 1993.

Teaching Experience

- **Lecturer** Fall 1995

  Department of Computer Science. University of Maryland at College Park.

  - lectured in the advanced undergraduate/graduate course on database design.

- **Graduate Teaching Assistant** 1990–1992

  Department of Mathematics. University of Maryland at College Park.

  - taught an introductory course on probability,
  - conducted discussion sessions for freshman calculus,
  - graded a course on computational methods for scientists and engineers.

- **Instructor** 1989–1990

  Department of Computer Science. University of Los Andes. Bogotá, Colombia.

  - taught an introductory course on formal methods in computer science,
  - taught a data structures course,
  - taught a course on the design of programs using structured programming and data abstraction.

- **Teaching Apprentice** 1988–1989

  Department of Mathematics. University of Los Andes. Bogotá, Colombia.

  - taught a course on algebra and trigonometry for freshmen.

Professional Activities

- **Member of**
  - The Association for Computing Machinery (ACM).
  - The ACM Special Interest Group on Artificial Intelligence (SIGART).
  - The Association for Logic Programming.
- **Referee for Journal Papers**
  - Journal of Logic Programming.
  - Data & Knowledge Engineering Journal.
- **Referee for Conference Papers**
  - International Joint Conference on Artificial Intelligence (IJCAI'95). Montréal, Canada. 1995.
  - Third International Conference on Logic Programming and Nonmonotonic Reasoning (LPNMR'95). Lexington, KY. USA. 1995.
  - International Conference on Tools with AI (ICTAI'95). 1995.
  - Fourth International Conference on Logic Programming and Automated Reasoning (LPAR'94). 1994.
  - Third International Conference on Logic Programming and Automated Reasoning (LPAR'93). 1993.
  - Joint International Conference and Symposium on Logic Programming (JICSLP'92). Washington, DC. USA. 1992.
- **Presenter of Refereed Articles in Conferences/Symposia**
  - "Mixing a Default Rule with Stable Negation". Fourth International Symposium on Artificial Intelligence and Mathematics, Fort Lauderdale, FL. USA. 1996
- **Participant in Conferences/Symposia**
  - Fifth International Conference on Artificial Intelligence and Law (ICAIL-95) College Park, MD. USA. 1995.
  - International Logic Programming Symposium (ILPS'94). Ithaca, NY. USA. 1994.
  - Joint International Conference and Symposium on Logic Programming (JICSLP'92). Washington, DC. USA. 1992.

Honors, Awards and Service

- Certificate of Merit, for serving as a graduate student mentor in the 1995 Summer Research Program. Presented by The Graduate School. Office of Minority Education. University of Maryland at College Park, 1995.
- Student Organizer, University of Maryland Institute for Advanced Computer Studies Lecture Series on Logic and Artificial Intelligence. 1993-Present.

Computer Skills

- **Languages:**

  Experienced with C, Prolog, Lisp, Latex and Latex2e, HTML, Pascal and Cobol.
- **Hardware/OS:**

  Experienced in UNIX. Have worked with SPARCstation/UNIX, SUN/UNIX 4.2, Micro-VAX II/ULTRIX and IBM PC's/MS-DOS.

Languages

- English and Spanish.
