

Silvius Rus

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Education

Ph.D. Student in Computer Science, Texas A&M University, Expected Summer 2006
Ph.D. Thesis: *Hybrid Analysis and its Application to Dynamic Compiler Optimization*.
Thesis advisor: Lawrence Rauchwerger.

B.S. in Computer Science, Babes-Bolyai University, Cluj, Romania, June 1997

Research Interests

Parallelizing and optimizing compilers.
Program representation and analysis.
Parallel libraries.

Awards

GAANN Fellowship, September 2005 – present

Graduate Student Research Excellence Award

Department of Computer Science at Texas A&M University, May 2005

Best Student Paper Award

“16th Annual ACM International Conference on Supercomputing”, New York City, June 2002

Member of the Junior Romanian Mathematics National Team, 1992

Experience

Research Assistant, Department of Computer Science, Texas A&M University, January 1999 – August 2005

Hybrid Analysis: A unified framework for static and dynamic, global, flow-sensitive memory reference analysis. The framework has been implemented in the Polaris compiler and applied to full program parallelization.

Value Evolution Graph: A novel representation of the data flow for generalized induction variables. It has led to a more accurate memory reference analysis, which in turn has enabled automatic parallelization.

Software design and implementation (using C++ and MPI) of a Discrete Ordinate Nuclear Particle Transport Simulator. The code executes on very large parallel systems (ASC machines).

Intern, IBM Thomas J. Watson Research Center, May 2002 – August 2002

MPI (Message Passing Interface) for the BlueGene/L architecture. Adapted the existent MPICH2 implementation based on TCP to the BlueGene/L proprietary interprocessor communication network. Achieved functional MPI implementation including the MPD job startup mechanism, which was validated on four NPB benchmark applications.

Teaching Assistant, Department of Computer Science, Texas A&M University, August 1998 – December 1998

Systems Analyst, TIM (Publicly held construction company), Cluj, Romania, September 1997 – July 1998

Intern, Romanian Bank for Development, Bistrita, Romania, July 1996 – August 1996

Teaching and Mentoring

GTA Fellow Certificate, Texas A&M University, Expected May 2006

Year-long Graduate Teaching Academy program consisting of a seminar series, class observation sessions and interactive workshops under the supervision of a faculty mentor.

Teaching Assistant: Compiler Design, Department of Computer Science, Texas A&M University, Fall 2005

Taught partially the undergraduate senior level compiler class, including giving lectures and grading final examination papers.

Teaching Assistant: Compiler Optimization, Department of Computer Science, Texas A&M University, Spring 2005

Presented and graded the projects in the graduate compiler optimization class.

Graduate Student Mentor, Department of Computer Science, Texas A&M University, Summer 2005

Was the graduate student mentor of an undergraduate visiting student in the *Research Experiences for Undergraduates* program. At the end of a ten weeks term, we completed the design and implementation of a visualization system for large graph structures such as compiler internal representations or web projects.

Teaching Assistant: Programming I, Department of Computer Science, Texas A&M University, Fall 1998

Was in charge of the laboratory for three sections totaling 51 students in the introductory programming class for non-majors. Primary duties included the presentation of projects and one-on-one discussions, composition of examination problems and grading. Received a 4.2 average grade on a 1 to 5 scale at the students' instructor evaluation.

Teacher Education, Babes-Bolyai University, Romania, 1993 – 1996

Took all the classes in the teacher education curriculum (psychology, pedagogy and teaching methods). These classes were optional and in addition to my degree plan.

Professional Service & Activities

Referee for scientific journals and conferences: IJHPCA, IJPP, TPDS, EuroPar, HIPC, HPCA, ICPP, IPDPS, LCPC, PACT and PPOPP.

Member of ACM.

Publications

Under Review

[1] **S. Rus** and L. Rauchwerger, "Hybrid Dependence Analysis for Automatic Parallelization", available as *Technical Report TR05-013*, Parasol Laboratory, Department of Computer Science, Texas A&M University, November 2005

Refereed

[2] **S. Rus**, G. He, and L. Rauchwerger, "Scalable Array SSA and Array Data Flow Analysis", *Proceedings of the 18-th Workshop on Languages and Compilers for Parallel Computing*, Hawthorne, New York, October 2005, to appear in Springer Lecture Notes in Computer Science

[3] **S. Rus**, D. Zhang, and L. Rauchwerger, "The Value Evolution Graph and its Use in Memory Reference Analysis", in *Proceedings of the IEEE International Conference on Parallel Architectures and Compilation Techniques*, pages 243–254, Juan-les-Pins, France, October 2004

[4] **S. Rus**, D. Zhang, and L. Rauchwerger, "Automatic Parallelization using the Value Evolution Graph", in *Proceedings of the 17-th Workshop on Languages and Compilers for Parallel Computing*, Springer Lecture Notes in Computer Science vol. 3602, pages 379–393, West Lafayette, Indiana, September 2004

[5] **S. Rus**, L. Rauchwerger, and J. Hoeflinger, "Hybrid Analysis: Static & Dynamic Memory Reference Analysis", in the *International Journal of Parallel Programming*, August 2003, Volume 31, Issue 4, pages 251–283, Invited extended version of the award paper in ICS 2002 [8].

[6] G. Almási, C. Archer, J. Castaños, M. Gupta, X. Martorell, J. Moreira, W. Gropp, **S. Rus**, and B. Toonen, "MPI on BlueGene/L: Designing an Efficient General Purpose Messaging Solution for a Large Cellular System", in *Proceedings of the 10th European PVM/MPI Users' Group Conference*, pages 352–361, Venice, Italy, September 2003

- [7] N.R. Adiga, ..., **S. Rus** et al., “An Overview of the BlueGene/L Supercomputer”, in *Proceedings of the “High Performance Networking and Computing Conference” (SC2002)*, pages 1–22, Baltimore, Maryland, November 2002.
- [8] **S. Rus**, L. Rauchwerger, and J. Hoeflinger, “Hybrid Analysis: Static & Dynamic Memory Reference Analysis”, in *Proceedings of the “16th Annual ACM International Conference on Supercomputing”*, pages 274–284, New York City, June 2002
Best Student Paper Award
- [9] P. An, A. Jula, **S. Rus**, S. Saunders, T. Smith, G. Tanase, N. Thomas, Nancy M. Amato, and L. Rauchwerger, “STAPL: an Adaptive, Generic Parallel C++ Library”, in *Proceedings of the “13-th Workshop on Languages and Compilers for Parallel Computing”*, Springer Lecture Notes in Computer Science vol. 2624, pages 193–208, Cumberland Falls, Kentucky, August 2001

Invited

- [10] **S. Rus**, D. Zhang, and L. Rauchwerger, “The Value Evolution Graph and its Use in Memory Reference Analysis”, in *Proceedings of the “11-th Workshop on Compilers for Parallel Computing”*, pages 175–186, Seon Monastery, Chiemsee, Germany, July 2004
- [11] P. An, A. Jula, **S. Rus**, S. Saunders, T. Smith, G. Tanase, N. Thomas, Nancy M. Amato, and L. Rauchwerger, “STAPL: an Adaptive, Generic Parallel C++ Library”, in *Proceedings of the “IEEE International Workshop on Advanced Compiler Technology for High Performance and Embedded Systems”*, pages 37–46, Bucharest, Romania, July 2001

Additional Information

Programming Languages, Operating Systems, Architectures

Excellent working knowledge of C++ (over 90,000 lines in large projects). Working knowledge of C, Fortran, and Visual Basic. Working knowledge of Unix shell, AWK, PERL, Matlab, SQL. Working knowledge of Linux and Windows. Experience with IBM BlueGene/L, HP V2200, SGI Origin and Altix parallel architectures.

Software and Tools

Various C/C++/Fortran compilers, OpenMP, MPI, CVS, Graphviz, Doxygen.

Work authorization

U.S. permanent resident.

Languages

Fluent in English and Romanian, can read well French and Spanish.

Extracurricular

Founded the Romanian Club at Texas A&M University.

References

Dr. Lawrence Rauchwerger

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