

Atanas (Nasko) Rountev
Department of Computer Science and Engineering
The Ohio State University
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Columbus, OH 43210

Education

Rutgers University, New Brunswick, New Jersey, September 1995 to August 2002
Ph.D. in Computer Science, August 2002 (GPA 4.0/4.0)
Dissertation: *Dataflow Analysis of Software Fragments*, advisor Prof. Barbara Ryder
M.S. in Computer Science, January 1999
Technical University, Sofia, Bulgaria, September 1990 to July 1995
B.S. in Computer Science and Engineering, July 1995

Professional Experience

The Ohio State University, Department of Computer Science and Engineering
Associate Professor, October 2008 to present
Assistant Professor, October 2002 to September 2008
Rutgers University, Department of Computer Science
Research Assistant, Programming Languages Research Group, June 1996 to August 2002
Teaching Assistant, June to August 1998
Bell Laboratories, Lucent Technologies, Software Production Research Department
Member of Technical Staff, June to August 1999
Siemens Corporate Research, Software Engineering Research Department
Visiting Researcher, June to August 1997

Research Interests

Software engineering; programming languages; compilers; static and dynamic program analysis; component-based software; parallel and distributed software; high-performance computing; software understanding and evolution; software testing

Publications

A major area of interest is *analysis in the presence of modern software features*, with focus on component-based software [CC08-1, CC06, ETX05, CBSE05, ICSM04, TSE04, ICSE03, CC01, FSE99], distributed software [WODA07, TSE06, ICSM05], long-running software [ICSE08, FSE07], run-time adaptation [SCAM07], and aspect-oriented features [AOSD08, ICSE07], Another significant area of interest is *reverse engineering*, both for UML sequence diagrams [PASTE05, VISSOFT05, ICSE05, FASE05, ISSTA04, PASTE04] and other artifacts [ICSM07, ICSM02]. Other interests include *static analysis of pointers and side effects* [ISSTA08, ETX06, SCAM06, SAVCBS05, TOSEM05, JASE04, SCAM02, ISSTA02, OOPSLA01, PLDI00] and *high-performance computing* [PPoPP09, SC08, ICS08, CC08-2, PPoPP08, PLDI07, HIPS07, SC06, ICCS06].

Research advisees are underlined.

Journal Publications

- [TSE06] 1. Mariana Sharp and Atanas Rountev, "Static Analysis of Object References in RMI-based Java Software", IEEE Transactions on Software Engineering, volume 32, number 9, pages 664-681, September 2006. **Special issue containing the best papers** from the IEEE International Conference on Software Maintenance (ICSM05). The journal paper has extensive revisions and significant amount of new content.
- [TOSEM05] 2. Ana Milanova, Atanas Rountev, and Barbara G. Ryder, "Parameterized Object

- Sensitivity for Points-to Analysis for Java", ACM Transactions on Software Engineering and Methodology, volume 14, number 1, pages 1-41, January 2005. **Invited for fast-track journal submission** by the Program Committee of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA02). A major expansion/revision of the original conference paper.
- [TSE04] 3. Atanas Rountev, Ana Milanova, and Barbara G. Ryder, "Fragment Class Analysis for Testing of Polymorphism in Java Software", IEEE Transactions on Software Engineering, volume 30, number 6, pages 372-387, June 2004. **Special issue containing the best papers** from the International Conference on Software Engineering (ICSE03). Substantially revised version of the conference paper, with significant new material.
- [JASE04] 4. Ana Milanova, Atanas Rountev, and Barbara G. Ryder, "Precise Call Graphs for C Programs with Function Pointers", International Journal on Automated Software Engineering, volume 11, number 1, pages 7-26, January 2004. **Special issue containing the best papers** from the IEEE International Workshop on Source Code Analysis and Manipulation (SCAM02). Extensive revision and expansion of the workshop paper.

Publications in Refereed Conferences and Workshops

- [PPoPP09] 1. Muthu Baskaran, Nagavijayalakshmi Vydyanathan, Uday Bondhugula, J. Ramanujam, Atanas Rountev, and P. Sadayappan, "Compiler-Assisted Dynamic Scheduling for Effective Parallelization of Loop Nests on Multicore Processors", ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming, pages ?, February 2009. (? submitted, ? accepted, ?% acceptance rate)
- [SC08] 2. D. Brian Larkins, James Dinan, Sriram Krishnamoorthy, Srinivasan Parthasarathy, Atanas Rountev, and P. Sadayappan, "Global Trees: A Framework for Linked Data Structures on Distributed Memory Parallel Systems", International Conference for High Performance Computing, Networking, Storage and Analysis, November 2008. (277 submitted, 59 accepted, 21% acceptance rate)
- [ISSTA08] 3. Guoqing Xu and Atanas Rountev, "Merging Equivalent Contexts for Scalable Heap-Cloning-Based Context-Sensitive Points-to Analysis", ACM SIGSOFT International Symposium on Software Testing and Analysis, pages 225-236, July 2008. (100 submitted, 26 accepted, 26% acceptance rate)
- [ICS08] 4. Muthu Baskaran, Uday Bondhugula, J. Ramanujam, Atanas Rountev, and P. Sadayappan, "A Compiler Framework for Optimization of Affine Loop Nests for GPGPUs", ACM International Conference on Supercomputing, pages 225-234, June 2008. (140 submitted, 37 accepted, 26% acceptance rate).
- [ICSE08] 5. Guoqing Xu and Atanas Rountev, "Precise Memory Leak Detection for Java Software Using Container Profiling", International Conference on Software Engineering, pages 151-160, May 2008. (371 submitted, 56 accepted, 15% acceptance rate). **Won an ACM SIGSOFT Distinguished Paper Award.**
- [AOSD08] 6. Guoqing Xu and Atanas Rountev, "AJANA: A General Framework for Source-Code-Level Interprocedural Dataflow Analysis of AspectJ Software", International Conference on Aspect-Oriented Software Development, pages 36-47, April 2008. (79 submitted, 17 accepted, 22% acceptance rate)
- [CC08-1] 7. Atanas Rountev, Mariana Sharp, and Guoqing Xu, "IDE Dataflow Analysis in the Presence of Large Object-Oriented Libraries", International Conference on Compiler Construction, pages 53-68, April 2008. (71 submitted, 18 accepted, 25% acceptance rate)
- [CC08-2] 8. Uday Bondhugula, Muthu Baskaran, Sriram Krishnamoorthy, J. Ramanujam, A. Rountev, and P. Sadayappan, "Automatic Transformations for Communication-Minimized Parallelization and Locality Optimization in the Polyhedral Model", International Conference on Compiler Construction, pages 132-146, April 2008. (71 submitted, 18 accepted, 25% acceptance rate)
- [PPoPP08] 9. Muthu Baskaran, Uday Bondhugula, Sriram Krishnamoorthy, J. Ramanujam, Atanas Rountev, and P. Sadayappan, "Automatic Data Movement and Computation Mapping

- for Multi-level Parallel Architectures with Explicitly Managed Memories”, ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming, pages 1-10, February 2008. (102 submitted, 25 accepted, 25% acceptance rate)
- [ICSM07] 10. Raffi Khatchadourian, Jason Sawin, and Atanas Rountev, “Automated Refactoring of Legacy Java Software to Enumerated Types”, IEEE International Conference on Software Maintenance, pages 224-233, October 2007. (214 submitted, 46 accepted, 21% acceptance rate).
- [SCAM07] 11. Jason Sawin and Atanas Rountev, “Improved Static Resolution of Dynamic Class Loading in Java”, IEEE International Working Conference on Source Code Analysis and Manipulation, pages 143-154, October 2007. (74 submitted, 19 accepted, 26% acceptance rate)
- [FSE07] 12. Guoqing Xu, Atanas Rountev, Yan Tang, and Feng Qin, “Efficient Checkpointing of Java Software Using Context-Sensitive Capture and Replay”, ACM SIGSOFT Symposium on the Foundations of Software Engineering, pages 85-94, September 2007. (251 submitted, 43 accepted, 17% acceptance rate)
- [PLDI07] 13. Sriram Krishnamoorthy, Muthu Baskaran, Uday Bondhugula, J. Ramanujam, Atanas Rountev, and P. Sadayappan, “Effective Automatic Parallelization of Stencil Computations”, ACM SIGPLAN Conference on Programming Language Design and Implementation, pages 235-244, June 2007. (178 submitted, 45 accepted, 25% acceptance rate)
- [ICSE07] 14. Guoqing Xu and Atanas Rountev, “Regression Test Selection for AspectJ Software”, International Conference on Software Engineering, pages 65-74, May 2007. (335 submitted, 49 accepted, 15% acceptance rate). **Nominated for an ICSE Distinguished Paper Award.**
- [WODA07] 15. Alexandar Pantaleev and Atanas Rountev, “Identifying Data Transfer Objects in EJB Applications”, Fifth International Workshop on Dynamic Analysis, p.5, May 2007. (11 submitted, 6 accepted, 54% acceptance rate)
- [HIPS07] 16. Rajikiran Panuganti, Muthu Baskaran, Ashok Krishnamurthy, Jarek Nieplocha, Atanas Rountev, and P. Sadayappan, “An Efficient Distributed Shared Memory Toolbox for MATLAB”, 12th International Workshop on High-Level Parallel Programming Models and Supportive Environments, March 2007. (15 submitted, 11 accepted, 73% acceptance rate).
- [SC06] 17. Sriram Krishnamoorthy, Umit Catalyurek, Jarek Nieplocha, Atanas Rountev, and P. Sadayappan, “Hypergraph Partitioning for Automated Memory Management”, International Conference for High Performance Computing, Networking, Storage and Analysis, p. 34, November 2006. (239 submitted, 54 accepted, 23% acceptance rate)
- [ETX06] 18. Jason Sawin, Mariana Sharp, and Atanas Rountev, “Generating Run-Time Progress Reports for a Points-to Analysis in Eclipse”, Eclipse Technology Exchange Workshop at OOPSLA, pages 40-44, October 2006. (30 submitted, 17 accepted, 57% acceptance rate)
- [SCAM06] 19. Jason Sawin and Atanas Rountev, “Estimating the Run-Time Progress of a Call Graph Construction Algorithm”, IEEE International Workshop on Source Code Analysis and Manipulation, pages 53-62, September 2006. (49 submitted, 20 accepted, 41% acceptance rate)
- [ICCS06] 20. Albert Hartono, Qingda Lu, Xiaoyang Gao, Sriram Krishnamoorthy, Marcel Nooijen, Gerald Baumgartner, Venkatesh Choppella, David Bernholdt, Russell Pitzer, J. Ramanujam, Atanas Rountev, and P. Sadayappan, “Identifying Cost-Effective Common Subexpressions to Reduce Operation Count in Tensor Contraction Evaluations”, International Conference on Computational Science, pages 267-275, May 2006. (300 submitted, 98 accepted, 33% acceptance rate)
- [CC06] 21. Atanas Rountev, Scott Kagan, and Thomas Marlowe, “Interprocedural Dataflow Analysis in the Presence of Large Libraries”, International Conference on Compiler Construction, pages 2-16, March 2006. (72 submitted, 17 accepted, 24% acceptance rate).
- [ETX05] 22. Mariana Sharp, Jason Sawin, and Atanas Rountev, “Building a Whole-Program Type Analysis in Eclipse”, Eclipse Technology Exchange Workshop at OOPSLA, pages 6-10,

- October 2005. (47 submitted, 27 accepted, 57% acceptance rate)
- [ICSM05] 23. Mariana Sharp and Atanas Rountev, “Static Analysis of Object References in RMI-based Java Software”, IEEE International Conference on Software Maintenance, pages 101-110, September 2005. (180 submitted, 55 accepted, 31% acceptance rate)
- [PASTE05] 24. Atanas Rountev, Olga Volgin, and Miriam Reddoch, “Static Control-Flow Analysis for Reverse Engineering of UML Sequence Diagrams”, ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering, pages 96-102, September 2005. (38 submitted, 17 accepted, 45% acceptance rate).
- [VISSOFT05] 25. Richard Sharp and Atanas Rountev, “Interactive Exploration of UML Sequence Diagrams”, IEEE Workshop on Visualizing Software for Understanding and Analysis, pages 8-13, September 2005. (26 submitted, 19 accepted, 73% acceptance rate)
- [SAVCBS05] 26. Gregory Kulczycki, Murali Sitaraman, Bruce Weide, and Atanas Rountev, “A Specification-based Approach to Reasoning about Pointers”, International Workshop on Specification and Verification of Component-Based Systems, pages 55-62, September 2005. (acceptance rate unknown)
- [ICSE05] 27. Atanas Rountev and Beth Harkness Connell, “Object Naming Analysis for Reverse-Engineered Sequence Diagrams”, International Conference on Software Engineering, pages 254-263, May 2005. (313 submitted, 44 accepted, 14% acceptance rate)
- [CBSE05] 28. Atanas Rountev, “Component-Level Dataflow Analysis”, International SIGSOFT Symposium on Component-Based Software Engineering, pages 82-89, May 2005. (91 submitted, 23 accepted, 25% acceptance rate)
- [FASE05] 29. Atanas Rountev, Scott Kagan, and Jason Sawin, “Coverage Criteria for Testing of Object Interactions in Sequence Diagrams”, Fundamental Approaches to Software Engineering, pages 282-297, April 2005. (99 submitted, 22 accepted, 22% acceptance rate).
- [ICSM04] 30. Atanas Rountev, “Precise Identification of Side-effect-free Methods in Java”, IEEE International Conference on Software Maintenance, pages 82-91, September 2004. (122 submitted, 38 accepted, 31% acceptance rate)
- [ISSTA04] 31. Atanas Rountev, Scott Kagan, and Michael Gibas, “Static and Dynamic Analysis of Call Chains in Java”, ACM SIGSOFT International Symposium on Software Testing and Analysis, pages 1-11, July 2004. (93 submitted, 26 accepted, 28% acceptance rate)
- [PASTE04] 32. Atanas Rountev, Scott Kagan, and Michael Gibas, “Evaluating the Imprecision of Static Analysis”, ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering, pages 14-16, June 2004. (36 submitted, 10 accepted, 28% acceptance rate)
- [ICSE03] 33. Atanas Rountev, Ana Milanova, and Barbara G. Ryder, “Fragment Class Analysis for Testing of Polymorphism in Java Software”, International Conference on Software Engineering, pages 210-220, May 2003. (324 submitted, 42 accepted, 13% acceptance rate)
- [ICSM02] 34. Ana Milanova, Atanas Rountev, and Barbara G. Ryder, “Constructing Precise Object Relation Diagrams”, IEEE International Conference on Software Maintenance, pages 586-595, October 2002. (127 submitted, 61 accepted, 48% acceptance rate)
- [SCAM02] 35. Ana Milanova, Atanas Rountev, and Barbara G. Ryder, “Precise Call Graph Construction in the Presence of Function Pointers”, IEEE International Workshop on Source Code Analysis and Manipulation, pages 155-163, October 2002. (23 submitted, 17 accepted, 74% acceptance rate)
- [ISSTA02] 36. Ana Milanova, Atanas Rountev, and Barbara G. Ryder, “Parameterized Object Sensitivity for Points-to and Side-Effect Analyses for Java”, ACM SIGSOFT International Symposium on Software Testing and Analysis, pages 1-11, July 2002. (97 submitted, 26 accepted, 27% acceptance rate)
- [OOPSLA01] 37. Atanas Rountev, Ana Milanova, and Barbara G. Ryder, “Points-to Analysis for Java Using Annotated Constraints”, Conference on Object-Oriented Programming, Systems, Languages, and Applications, pages 43-55, October 2001. (145 submitted, 27 accepted, 19% acceptance rate)
- [CC01] 38. Atanas Rountev and Barbara G. Ryder, “Points-to and Side-effect Analyses for

- Programs Built with Precompiled Libraries”, International Conference on Compiler Construction, pages 20-36, April 2001. (69 submitted, 22 accepted, 32% acceptance rate)
- [PLDI00] 39. Atanas Rountev and Satish Chandra, “Off-line Variable Substitution for Scaling Points-to Analysis”, ACM SIGPLAN Conference on Programming Language Design and Implementation, pages 47-56, June 2000. (173 submitted, 30 accepted, 17% acceptance rate)
- [FSE99] 40. Atanas Rountev, Barbara G. Ryder, and William Landi, “Data-Flow Analysis of Program Fragments”, ACM SIGSOFT Symposium on the Foundations of Software Engineering, pages 235-252, September 1999. (141 submitted, 29 accepted, 21% acceptance rate)

Funding

1. “BIGFOOT: Searching for the Elusive Small Memory Footprint for Java Applications”, IBM Software Quality Innovation Award, PI: Atanas Rountev, \$25,000, January 2009 – December 2009
2. “An Effective Automatic Parallelization Framework for Multi-Core Architectures”, National Science Foundation CCF-0811781, PI: P. Sadayappan, co-PI: Atanas Rountev, \$500,000, September 2008 – August 2011
3. “CAREER: Dataflow Analysis for Modern Software Systems”, National Science Foundation CCF-0546040, PI: Atanas Rountev, \$407,000, September 2006 – August 2011
4. “An Integrated Framework for Compile-Time/Run-time Support for Multi-scale Applications on High-end Systems”, National Science Foundation CNS-0509467, PI: P. Sadayappan, co-PI: Atanas Rountev, \$348,000, September 2005 – August 2008
5. “TACLE: Type Analysis and Call Graph Construction for Eclipse”, IBM Eclipse Innovation Grant, PI: Atanas Rountev, \$27,000, January 2005 – December 2005
6. “Comprehensive Assessment and Planning Model Interim Solution (CAPMIS) Pilot Evaluation Project”, Ohio Department of Job and Family Services, PI: Scottye J. Cash (Social Work), co-PIs: Denise Bronson, Celeste Burke, Tom Gregoire (Social Work), Atanas Rountev (Computer Science and Engineering), \$1,267,200, October 2005 – June 2007

Professional Activities

- Editorial Board member for Springer’s journal Information and Software Technology
- Program Committee member for
 - 16th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2008)
 - 8th ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE 2008)
 - 6th International Workshop on Dynamic Analysis (WODA 2008): **PC co-chair**
 - Workshop on Performance Optimization for High-Level Languages and Libraries (POHLL 2008)
 - Demos/Tools Track, 30th International Conference on Software Engineering (ICSE 2008)
 - 29th International Conference on Software Engineering (ICSE 2007)
 - 23rd IEEE International Conference on Software Maintenance (ICSM 2007)
 - 7th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM 2007)
 - 4th International Workshop on Software Quality Assurance (SOQUA 2007)
 - Workshop on Performance Optimization for High-Level Languages and Libraries (POHLL 2007)
 - ACM International Symposium on Software Testing and Analysis (ISSTA 2006)
 - 22nd IEEE International Conference on Software Maintenance (ICSM 2006)
 - 4th Eclipse Technology Exchange Workshop at OOPSLA (ETX 2006)
 - 4th International Workshop on Dynamic Analysis (WODA 2006)

- 6th IEEE International Workshop on Source Code Analysis and Manipulation (SCAM 2006)
- 21st IEEE International Conference on Software Maintenance (ICSM 2005)
- 6th International Symposium on Automated and Analysis-Driven Debugging (AADEBUG 2005)
- 3rd International Workshop on Dynamic Analysis (WODA 2005)
- Panelist for two NSF panels
- Reviewer for
 - National Sciences and Engineering Research Council of Canada (NSERC)
 - ACM SIGPLAN Dissertation Award competition
 - UK Council of Professors and Heads of Computing – dissertation competition
 - ACM Transactions on Software Engineering and Methodology (TOSEM)
 - IEEE Transactions on Software Engineering (TSE)
 - ACM Transactions on Programming Languages and Systems (TOPLAS)
 - Journal of Software Maintenance and Evolution (JSME)
 - Journal of Software Testing, Verification, and Reliability (STVR)
 - Journal of Information and Software Technology (IST)
 - Software: Practice and Experience
 - SIAM Journal of Computing
 - ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE)
 - International Conference on Software Engineering (ICSE)
 - ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)
 - ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)
 - ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL)
 - ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)
 - ACM International Conference on Supercomputing (ICS)
 - Supercomputing: International Conference for High Performance Computing, Networking, Storage and Analysis (SC)
 - IEEE International Parallel and Distributed Processing Symposium (IPDPS)
 - ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE)
 - International Workshop on Languages and Compilers for Parallel Computing (LCPC)
 - Workshop on Performance Optimization for High-Level Languages and Libraries (POHLL)
- Member of
 - Association for Computing Machinery (ACM)
 - ACM Special Interest Group on Software Engineering (SIGSOFT)
 - ACM Special Interest Group on Programming Languages (SIGPLAN)
 - IEEE Computer Society
 - American Association of University Professors (AAUP)

Graduate Advising

- Current students
 - Scott Kagan (Ph.D.)
 - Sudhir Patel (Ph.D.)
 - Jason Sawin (Ph.D.)
 - Arjun Singri (M.S.)
 - Aditi Tagore (Ph.D.)
 - Kevin Van Valkenburgh (M.S.)
 - Guoqing Xu (Ph.D.)
- Students co-advised with Prof. Sadayappan
 - Rajkiran Panuganti (Ph.D.)

- Former students (chronological list)
 - Alexandar Pantaleev, Ph.D. thesis: “*Dynamic Analyses for Understanding and Optimization of the Enterprise Java Applications*” (August 2008)
 - Mariana Sharp, Ph.D. thesis: “*Static Analyses for Java in the Presence of Distributed Components and Large Libraries*” (August 2007)
 - Beth Harkness Connell, M.S. thesis: “*Object Naming in Reverse Engineering of UML Sequence Diagrams*” (November 2004)
 - Chris Kuck, M.S. thesis: “*Class Analysis for Extensible Java Software*” (September 2004)
 - Olga Volgin, M.S. thesis: “*Analysis of Flow of Control for Reverse Engineering of Sequence Diagrams*” (June 2004)
 - Miriam Reddoch, M.S. thesis: “*Intra-Method Test Coverage of Reverse-Engineered Sequence Diagrams*” (March 2004)

Teaching

- Software Development in Java (CSE 421): Winter 2009
- Introduction to the Principles of Programming Languages (CSE 655): Spring 2005, Autumn 2005, Winter 2006, Spring 2006, Autumn 2006, Winter 2007, Autumn 2007, Spring 2008, Autumn 2008, Winter 2009
- Programming Languages (CSE 755): Winter 2004, Winter 2005, Spring 2007, Winter 2008, Spring 2009
- Compiler Design and Implementation (CSE 756): Spring 2009
- Software Engineering (CSE 757): Autumn 2002, Winter 2003, Autumn 2003, Autumn 2004
- Analysis and Testing of Object-Oriented Software (CSE 788): Winter 2003, Winter 2004, Spring 2006
- Dynamic Analysis of Imperative and Object-Oriented Software (CSE 788): Spring 2008

Departmental Service

- Graduate Studies Committee, Autumn 2002 to Spring 2005, Autumn 2007 to present
- Faculty Search Committee, Autumn 2008 to present
- Curriculum Committee, Autumn 2006 to Spring 2008
- Graduate Admissions Committee, Autumn 2005 to Spring 2006
- Qualifying/Comprehensive Examination Committee, Autumn 2004, Spring 2005, Autumn 2007, Spring 2008

Awards

- Best papers at ICSE’08, ICSM’05, ICSE’03, SCAM’02
- Nominated by the Department of Computer Science at Rutgers University for the ACM Doctoral Dissertation Award, September 2002
- Excellence Fellowship for Doctoral Studies, 1995, Graduate School, Rutgers University
- Outstanding Academic Achievements Award (highest honors for graduating students), 1995, Technical University, Sofia, Bulgaria
- National Academic Excellence Award, 1993 and 1994, Eureka Foundation, Sofia, Bulgaria