

Antonio Cunei

CONTACT INFORMATION

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PROFESSIONAL EXPERIENCE

- > **Purdue University** West Lafayette, Indiana, USA
Postdoctoral Research Associate July 2004 - present
Conducting research in the context of the DARPA project Program Composition for Embedded System (PCES), in particular on the Ovm/J Java virtual machine framework.
- > **Sun Microsystems Laboratories** Mountain View, California, USA
Research Intern - Mayhem Group July 2002 - September 2002
Conducted an investigation on the use of dynamic profiling when using pre-allocation in segregated thread-local heaps.
- > **Sun Microsystems Laboratories** Mountain View, California, USA
Research Intern - Mayhem Group July 2001 - September 2001
Developed a memory simulator and a statistical package for a tracing Java Virtual Machine. The research subsequently developed into a US Patent.
- > **International Centre for Theoretical Physics** Trieste, Italy
Visiting Scientist February 1998 - January 1999
Participated in the development of fast digital cameras and related imaging systems for applications in biology. Work involved both software development and hardware design.
- > **University of Udine** Udine, Italy
System/Network Manager February 1991 - August 1998
System administrator (responsible of services for 400 users), co-developed the administrative computer network (12 sites). Responsible of the system administration of the library computer system. Trained personnel.

EDUCATION

- > **University of Glasgow** Glasgow, Scotland, United Kingdom
Ph.D., Computer Science December 2004
Research focused on offering support for precise memory management in the runtime system of object-oriented programming languages.
- > **University of Glasgow** Glasgow, Scotland, United Kingdom
M.Sc., Advanced Information systems September 2000
Graduated with Distinction. Work involved designing and implementing support for orthogonal persistence and resumable computations for a programming language.

- > **University of Udine** Udine, Italy
M.Sc. (Laurea), Computer Science July 1999
Graduated Summa cum Laude. The final thesis explored the implementation of multiple dispatching in programming languages.

SKILLS

- > Extensive experience with Java and Java virtual machines. Worked on the Ovm Real-Time Java virtual machine and ahead-of-time compiler, memory management, dynamic bytecode generation, dispatching mechanisms, real-time checkpointing.
- > Proficient in low-level programming, assembly language. Ported the Ovm Java VM to the SPARC and ARM microprocessors, worked with PowerPC, x86 processors, DSPs, microcontrollers, embedded platforms.
- > Experience with the issues related to implementing accurate garbage collection systems in uncooperative environments.
- > Wide-ranging experience with programming languages and development environments, from Java and C/C++ to Prolog, Scheme, ML, others.
- > Interested in applying formal techniques to concrete systems, in particular in the use of Theorem Proof Assistants (Coq) to formalize and verify design and implementation of programming environments and computer systems.
- > Experience with the GNU Compiler Collection internals, with particular regard to the back end infrastructure. Customized GCC to better support precise memory reclamation.
- > Solid background in electronics and digital design, hardware development.

ADDITIONAL TRAINING

- > Participation in the "ICTP-UNU-Microprocessor Laboratory Fifth Course on Basic VLSI Design Techniques", jointly organised by the International Centre for Theoretical Physics and the United Nations University.
- > Istituto Tecnico Industriale A. Malignani, Udine, Italy. Technical high-school diploma in industrial electronics.
- > Attended workshops of the College Teaching Workshop Series, organized by the Center for Instructional Excellence, Purdue University.

TEACHING EXPERIENCE

- > Introduction to Theorem Proof Assistants (Coq), module of the Software Engineering Course (CS510), Purdue University 2006.
- > Teaching assistant: Core Module of the M.Sc. in Information Technology, University of Glasgow, 1999. Teaching, conducting lab exercises, marking assignments.
- > Teaching assistant: Overseas Students Tutor, M.Sc. in Information Technology, University of Glasgow, 1999. Teaching supplemental lectures, assisting students.
- > Taught personnel IT training courses, University of Udine, Italy.

JOURNALS

- > A. Cuneì, J. Vitek. An Efficient and Flexible Toolkit for Composing Customized Method Dispatchers. *Software: Practice & Experience (SP&E)* (to appear)
- > A. Armbruster, J. Baker, A. Cuneì, C. Flack, D. Holmes, F. Pizlo, E. Pla, M. Prochazka, J. Vitek. A Real-Time Java Virtual Machine for Avionics. *ACM Transactions on Embedded Computing Systems (TECS)* (to appear)
- > F. Mammano, M. Canepari, G. Capello, R.B. Ijaduola, A. Cuneì, L. Ying, F. Fratnik, A. Colavita. An optical recording system based on a fast CCD sensor for biological imaging. In *Cell Calcium*, 25(2):115–123, February 1999
- > A. Colavita, G. Capello, R.B. Ijaduola, A. Cuneì, L. Lagostena, M. Canepari, F. Mammano. Intracellular gradients of free calcium visualized in sensory and neuronal cells by a high-performance fluorescence imaging system. In *Optical Manipulation of Living Cells*. D.L. Farkas, R.C. Leif, B.J. Tromberg, Eds. Proceedings of SPIE Series, Vol. 3604, pp. 100-106, January 1999

CONFERENCES AND WORKSHOPS

- > J. Baker, A. Cuneì, F. Pizlo, J. Vitek. Accurate Garbage Collection in Uncooperative Environments with Lazy Pointer Stacks. In *Proceedings of Compiler Construction, 16th International Conference (CC 2007)*, part of the Joint European Conferences on Theory and Practice of Software (ETAPS 2007), March 26–30, 2007, Braga, Portugal
- > A. Cuneì, J. Vitek. A New Approach To Real-Time Checkpointing. In *Proceedings of the 2nd ACM Virtual Machine and Execution Environments Conference (VEE 2006)*, June 14–16, 2006, Ottawa, Canada
- > J. Baker, A. Cuneì, C. Flack, F. Pizlo, M. Prochazka, J. Vitek, A. Armbruster, E. Pla, D. Holmes. Real-time Java in Avionics Applications. In *Proceedings of the 11th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS 2006)*, April 4–7, 2006, San Jose, California, USA
- > J. Manson, J. Baker, A. Cuneì, S. Jagannathan, M. Prochazka, B. Xin, J. Vitek. Preemptible Atomic Regions for Real-time Java. In *Proceedings of the 26th IEEE Real-Time Systems Symposium (RTSS 2005)*, 6–8 December 2005, Miami, Florida, USA
- > A. Cuneì, J. Vitek. PolyD: A Flexible Dispatching Framework. In *Proceedings of the 20th ACM SIGPLAN International Conference on Object-Oriented Programming, System, Languages and Applications (OOPSLA 2005)*, SIGPLAN Notices, 40(10):487–503, October 16–20, 2005 San Diego, California, USA
- > J. Baker, K. Bennet, A. Cuneì, C. Flack, C. Grothoff, D. Holmes, A. Madan, G. Markova, J. Manson, K. Palacz, F. Pizlo, M. Prochazka, J. Thomas, H. Yamauchi, J. Vitek. Design and implementation of the Ovm RTSJ VM: an experience report. *3rd Workshop on Java Technologies for Real-time and Embedded Systems*, October 16–20, 2005, San Diego, California, USA

- > A. Cunei, J. Vitek. Techniques for Real-Time Checkpointing. *3rd Workshop on Java Technologies for Real-time and Embedded Systems*, October 16–20, 2005, San Diego, California, USA
- > I. Dragos, A. Cunei, J. Vitek. Continuations in the Java Virtual Machine. *2nd Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems (ICOOOLPS'2007)*, July 30, 2007, Berlin, Germany

PATENTS

- > A. Cunei. Memory management unit technique to detect cross-region pointer stores. US Patent No. 7,191,307
- > M. Wolczko, A. Cunei. Fast lifetime analysis of objects in a garbage-collected system. US Patent No. 6,728,738

OTHER PUBLICATIONS

- > A. Cunei. A Multimethod-Based Orthogonally Persistent Programming Language, Technical Report TR-2001-81, Department of Computing Science, University of Glasgow (Scotland)
- > A. Cunei. Use of Preemptive Program Services with Optimised Native Code. Ph.D. Thesis, University of Glasgow (Scotland), December 2004

INVITED TALKS

- > A. Cunei. PolyD: A Flexible Dispatching Framework. Sun Microsystems Laboratories, Burlington, Massachusetts, July 2005

REVIEWING ACTIVITY

- > Science of Computer Programming, published by Elsevier
- > ACM Transactions on Programming Languages and Systems (TOPLAS)
- > Software: Practice and Experience, published by Wiley
- > European Symposium on Programming (ESOP), part of the European Joint Conferences on Theory and Practice of Software (ETAPS)
- > Workshop on Bytecode Semantics, Verification, Analysis and Transformation (BYTECODE)

GRANTS

- > J. Vitek, A. Cunei, S. Jagannathan. Grant proposal NSF-CT 0716659, "CT-ER: Controlled Declassification with Software Transactional Memory". Accepted by the National Science Foundation for an award of \$250,000.

AWARDS

- > University of Glasgow Postgraduate Research Scholarship, 2000-2003 (only one of these scholarships is awarded annually by the CS Department)
- > Engineering and Physical Sciences Research Council Studentship, 1999-2000

LANGUAGES

- > Italian: native speaker
- > English: fluent, lived eight years in English-speaking countries
- > German: attended a first-level course

REFERENCES

Prof. Jan Vitek

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