

Peter Pirkelbauer

e-mail: peter.pirkelbauer@tamu.edu

Education

PhD in Computer Science with emphasis on Programming Languages and Tools (adviser: Dr. Bjarne Stroustrup), Texas A&M University, College Station, TX, expected Spring 2010.

MBA with emphasis on Finance, Texas A&M University, College Station, TX, May 2003.

Dipl.-Ing. in Computer Science with emphasis on Software Engineering and System Programming (adviser: Dr. Hanspeter Mössenböck), Johannes - Kepler Universität, Linz, Austria - July 1997.

Erasmus Exchange Student, Universidad de Murcia, Murcia, Spain, Fall 1995 - Spring 1996.

Research Interests

Static Analysis, Source Code Transformation Systems, and Compilers

Programming Language Design and Programming Techniques

Concurrent Non-Blocking Software Design

Multi-core Programming

Work Experience

Teaching Assistant for Introduction to Computer Systems (CSCE313). Fall 2009.
Taught lab classes and graded homework assignments and programming projects.

Research Assistant in the Parasol Lab, Group for Programming Languages, Techniques, and Tools, Texas A&M University, July 2003 - present.

- The Pivot source-to-source translation infrastructure:
 - * Developed the Pivot's C++ frontend that converts EDG's intermediate program representation to IPR (the Pivot's internal program representation).
 - * Developed a generic abstract syntax tree traversal framework.
 - * Designed and implemented a light weight pattern specification language. The use of an extended C++ like syntax allows programmers define source code patterns in a form that abstracts away from representation details.
 - * Designed and implemented a source code rejuvenation framework (e.g., concept recovery from uninstantiated templates).
- Designed and implemented a lock-free dynamically resizable array.
- Extended C++ with open-methods and implemented a prototype compiler (based on the EDG C++ frontend).

Software Engineer (Internship) in the Photoshop Team, Adobe Systems, Summer 2006.
Worked on a programming model that unifies the benefits of the generic programming and object oriented programming paradigm.

Research Assistant (Internship), Lawrence Livermore National Labs, Summer 2005.
Developed an interface between Rose (LLNL) and The Pivot (Texas A&M), two compiler frameworks supporting analysis and transformations of C++ programs.

Consultant for a city development project, Ingenieurbüro Retter, Krems, Austria, May - June 2003. Designed and implemented a route recovery software. Based on license plate readings obtained from a number of locations, the software calculates routes and time-sensitive estimates for the traffic volume within a city.

Software Engineer for a TQM - project, VA Stahl Linz GmbH, Austria, Oct 1998 - Aug 2001. Tasks included all phases of software development from system analysis, system design, implementation, maintenance to subproject supervision and end user training.

- Designed and implemented a domain specific language (DSL) that dispenses with the direct use of a database query language (SQL). The DSL allows to model and modify client, plant, and process specific business rules during runtime. A DSL specific programming environment provides visual code blocks to further ease writing rules. The whole system reduces the amount of man-hours that professional programmers spend on defining and maintaining business logic.
- Developed a Material Defect Catalog to supply the data capture level with predefined context sensitive input. This electronic information system replaced the existing paper catalog.
- Designed and implemented an on-line surface assistant comparing graded material defects against client specific defect tolerances in order to support human material inspectors in real-time.
- Designed and supervised the implementation of a workflow-component that controls the maintenance process (i.e., versioning, submission, approval) of master data (e.g., check lists, rules).

Social Worker in an elderly home, BAH Leonding, Austria, Oct 1997 - Sep 1998.

System Programmer (Internship), ModulaWare, La Chanenche, France, Summer 1997. Migration of the OpenVMS AlphaOberon integrated development and runtime environment (e.g., loader, allocator, garbage collector) to support the 64bit memory management capabilities provided by the OpenVMS operating system running on a DEC Alpha microarchitecture.

Jr. Teaching Assistant, Johannes - Kepler University, Austria, Fall 1993 - Spring 1995, Spring 1997. Junior Teaching Assistant for Computer Science courses including Introduction to Programming and Algorithms.

Software Developer, Sägewerk - Ing. Stöglehner, Rainbach i. M., Austria, Jan - Apr 1993. Developed billing and inventory management software for sawmills.

Professional Services

Book review: Herb Sutter, Andrei Alexandrescu: C++ Coding Standards, 101 Rules, Guidelines, and Best Practices (C++ in Depth Series), Addison-Wesley, November, 2004.

Scientific Journals: Joint reviewer for Software Practice and Experience and ACM Transactions in Embedded Computing Systems.

Other Skills

Spoken Languages: German, English, Spanish.

Programming Languages: C++, C, Haskell, Promela, Java, Oberon-2, PL/SQL.

Applications: Lex, Yacc, EDG C++ frontend, Spin Model Checker, Firebird DB, Oracle DB and administration tools, Oracle development tools.

Operating Systems: Windows, Linux (Ubuntu, CentOS), OpenVMS.

Peer Reviewed Publications

Damian Dechev, Peter Pirkelbauer, Bjarne Stroustrup: *Understanding and Effectively Preventing the ABA Problem in Descriptor-based Lock-free Designs*. In 13th IEEE International Symposium on Object/component/service-oriented Real-time distributed computing (ISORC), 2010. to appear.

Peter Pirkelbauer, Damian Dechev, Bjarne Stroustrup: *Source Code Rejuvenation is not Refactoring*. In 36th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM), LNCS 5901, Springer 2010.

Peter Pirkelbauer, Yuriy Solodkyy, Bjarne Stroustrup: *Design and Evaluation of C++ Open Multi-Methods*. In Science of Computer Programming, 2009. Elsevier Journal, to appear ([dx.doi.org/10.1016/j.scico.2009.06.002](https://doi.org/10.1016/j.scico.2009.06.002)).

Peter Pirkelbauer, Sean Parent, Mat Marcus, Bjarne Stroustrup: *Dynamic Algorithm Selection for Runtime Concepts*. In Science of Computer Programming, 2009. Elsevier Journal, to appear ([dx.doi.org/10.1016/j.scico.2009.04.002](https://doi.org/10.1016/j.scico.2009.04.002)).

Damian Dechev, Peter Pirkelbauer, Nicolas Rouquette, Bjarne Stroustrup: *Semantically Enhanced Containers for Concurrent Real-Time Systems*. In Proceedings of 16th Annual IEEE International Conference and Workshop on the Engineering of Computer Based Systems (IEEE ECBS), April 2009.

Damian Dechev, Nicolas Rouquette, Peter Pirkelbauer, Bjarne Stroustrup: *Verification and Semantic Parallelization of Goal-Driven Autonomous Software* In Proceedings of 2nd International Conference on Autonomic Computing and Communication Systems (ACM Autonomics), 2008, Turin, Italy. (acceptance rate = 30%)

Peter Pirkelbauer, Sean Parent, Mat Marcus, Bjarne Stroustrup: *Runtime Concepts for the C++ Standard Template Library*. In Proceedings of the 2008 ACM symposium on Applied computing (SAC), 2008. ACM Press. (acceptance rate = ~30%)

Peter Pirkelbauer, Yuriy Solodkyy, Bjarne Stroustrup: *Open Multi-Methods for C++*. In proceedings of the 6th International Conference on Generative Programming and Component Engineering (GPCE), 2007. ACM Press. (acceptance rate = 31%)

Damian Dechev, Peter Pirkelbauer, Bjarne Stroustrup: *Lock-free Dynamically Resizable Arrays*. In Proceedings of 10th International Conference on Principles of Distributed Systems (OPODIS), 2006, LNCS 4305, Springer 2006. (acceptance rate = 12%)

Markus Hof, Hanspeter Mössenböck, Peter Pirkelbauer: *Zero-Overhead Exception Handling Using Metainformation*. In Proceedings of 24th Seminar on Current Trends in Theory and Practice of Informatics (SOFSEM), LNCS 1338, Springer 1997.

Technical Reports

Peter Pirkelbauer, Yuriy Solodkyy, Bjarne Stroustrup: *Report on language support for Multi-Methods and Open-Methods for C++*. TR N2216, ISO WG21, March 2007.

Peter Pirkelbauer, Markus Hof, Hanspeter Mössenböck: *Zero-Overhead Exception Handling Using Metainformation* TR CS-SSW-P97-07, Johannes Kepler University Linz, Austria, September 1997.

Book Chapter

Damian Dechev, Nicolas Rouquette, Peter Pirkelbauer, Bjarne Stroustrup: *Programming and Validation Techniques for Reliable Goal-driven Autonomic Software*. Book Chapter in Autonomic Communication. Vasilakos, A.; Parashar, M.; Karnouskos, S.; Pedrycz, W. (Eds.), ISBN: 978-0-387-09752-7, Springer, May 2009.

Invited Talk and Workshop Participation

The Pivot - a source-to-source framework for getting more elegant and efficient code. Invited Talk. ISCR - Lawrence Livermore National Lab, August 2006.

The Pivot Framework: Design and Implementation. Workshop on Domain Specific Languages. with Steve Cook, Damian Dechev, and Gabriel Dos Reis. Argonne National Lab, August 2004.