

# Resume of Arno Puder

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LANGUAGES	German (native), English.
EDUCATION	4/93 Masters in Computer Science, University of Kaiserslautern, Germany. 7/97 Ph.D. in Computer Science, University of Frankfurt, Germany. 9/97-8/98 Postdoc at the International Computer Science Institute, Berkeley.
RESEARCH INTERESTS	Distributed Systems Ubiquitous Computing Sensor Networks
EMPLOYMENT	5/85-8/85 MDS-Deutschland GmbH (printer device driver) 1987 TÜV-Rheinland (database development) 1988 StarDivision (Import/Export document filter) 1/91-12/92 CSC Ploenzke AG (GUI development, Visual-C++, MFC / Borland, OWL) 6/93-12/96 Research Assistant at the University of Frankfurt, Germany. 1/97-12/98 Project Manager R&D department of Deutsche Telekom AG, Germany. 1/99-12/2000 Sr. Project Manager for Deutsche Telekom AG in San Francisco. 1/2001-8/2002 AT&T Labs Research, Menlo Park. since 9/2002 Assistant Professor, San Francisco State University.
TEACHING EXPERIENCE	1993-1996 TA positions for operating systems and distributed system classes. 1993-1998 Supervision of graduate students master thesis. 1996 Undergraduate level C++ and Java class at the University Fulda, Germany.
AWARDS AND HONORS	1993 Masters in Computer Science, with honors. 1997 Ph.D. in Computer Science, with honors. 1998 International Computer Science Institute, Scholarship for a postdoc position. 1998 Best paper IEEE conference on ATM.

2005	Duke Award for the NetBEAMS project at the JavaOne 2005 convention.
2006	Presidential Award, San Francisco State University.

# Publications

Updated: 6/2006

- 1992 [1] D. Maaß, E. Elbrächter, A. Puder  
**SIS - Security Interoperability Sublayer.**  
Technical Report, University of Kaiserslautern,  
Computing Service Center.
- 1993 [2] A. Puder  
**Ein formales Sicherheitsmodell für Message Handling Systems.**  
Master thesis, University of Kaiserslautern.
- [3] K. Geihs, H. Gründer, and A. Puder  
**Object Sharing in Open Distributed Processing Systems.**  
In *Entwicklung und Management verteilter Anwendungssysteme*,  
Johann Wolfgang Goethe University, Frankfurt.  
GI/ITG Fachgruppe Kommunikation und Verteilte Systeme.
- 1994 [4] A. Puder  
**A Declarative Extension of IDL-based Type Definitions  
within Open Distributed Environments.**  
In *International Conference on Object Oriented Information  
Systems (OOIS)*, pages 423-436, South Bank University, London.  
Springer-Verlag.
- [5] T. Seidel, A. Puder, K. Geihs, and H. Gründer  
**Global Object Space: Modell und Implementation.**  
Technical Report, Computer Science Department,  
Johann Wolfgang Goethe University, Frankfurt.
- 1995 [6] A. Puder, S. Markwitz, F. Gudermann, and K. Geihs  
**AI-based Trading in Open Distributed Environments.**  
In *3rd International IFIP TC6 Conference on Open Distributed  
Processing (ICODP'95)*, Brisbane, Australia, Chapman and Hall.
- [7] K. Geihs, B. Bär, and A. Puder  
**Towards Open Service Environments.**  
In K.P. Birman, F. Mattern, and A. Schiper, editors,  
*Theory and Practice in Distributed Systems*,  
LNCS 938, pages 153-163. Springer-Verlag.
- [8] K. Geihs, H. Gründer, A. Puder, W. Lamersdorf, M. Merz,  
and K. Müller  
**Systemunterstützung für offene verteilte Dienstmärkte.**  
In *KiVS'95 - Kommunikation in Verteilten Systemen*, pages 445-459,  
Chemnitz. Springer-Verlag.
- [9] A. Puder, S. Markwitz, and F. Gudermann  
**Service Trading Using Conceptual Structures.**  
In *3rd International Conference on Conceptual Structures  
(ICCS'95)*, pages 59-73, Santa Cruz, University of California,  
Springer-Verlag.

- [10] A. Puder, F. Gudermann, and S. Markwitz  
**Ein mehrphasen Protokoll für wissensbasierte Dienstvermittlung.**  
In *Entwicklung und Management verteilter Anwendungssysteme (EMVA)*, Münster, Krehl Verlag.
- 1996 [11] A. Puder and C. Burger  
**New Concepts for Qualitative Trader Cooperation.**  
In A. Schill et al., editors, *International Conference on Distributed Platforms*, Chapman & Hall.
- [12] A. Puder and K. Geihs  
**System Support for Knowledge-based Trading in Open Service Markets.**  
In *7th ACM SIGOPS European Workshop*, Connemara, Ireland.
- [13] A. Puder and A. Alireza  
**Service Type Specification through Conceptual Graphs.**  
In *Workshop on Visual Reasoning*, Rutgers University.
- 1997 [14] A. Puder and K. Römer  
**Use of Meta-Information in a CORBA Environment.**  
In *Workshop on CORBA: Implementation, Use and Evaluation*, Jyväskylä, Finland.
- [15] A. Puder and K. Geihs  
**Meta-Level Service Type Specifications.**  
In *4th International IFIP TC6 Conference on Open Distributed Processing (ICODP'97)*, Toronto, Canada, Chapman and Hall.
- [16] A. Puder  
**Typsysteme für die Dienstvermittlung in offenen verteilten Systemen.**  
Ph.D. thesis, Computer Science Department,  
Johann Wolfgang Goethe University, Frankfurt.
- [17] A. Puder and K. Römer  
**Generic Trading Service in Telecommunication Platforms.**  
In *5th International Conference on Conceptual Structures (ICCS'97)*, pages 551-565, Seattle, University of Washington,  
Springer-Verlag.
- 1998 [18] A. Puder and K. Römer  
**MICO - User and Reference Manual.**  
Technical Report TR-98-031, International Computer Science Institute,  
Berkeley.
- [19] A. Puder and K. Römer  
**MICO - A CORBA 2.0 Compliant Implementation.**  
dpunkt Verlag, Heidelberg  
ISBN 3-932588-11-8

- [20] A. Puder and M. Moscarda  
**Native ATM Support for CORBA Platforms.**  
In *International Conference on ATM (ICATM'98)*,  
IEEE Conference, Colmar, Frankreich.
- [21] J. de Meer, A. Hafid, and A. Puder  
**The Quality of Service (QoS) Binding Model.**  
In *6th International Workshop on Quality of Service (IWQoS'98)*  
IEEE Workshop, Napa, California, USA.
- [22] A. Puder  
**Mapping of CGI to operational interfaces.**  
In *6th International Conference on Conceptual Structures (ICCS'98)*, Montpellier, Frankreich, Springer-Verlag.
- 2000 [23] A. Puder and K. Römer  
**MICO: An Open Source CORBA Implementation.**  
Morgan Kaufmann Publishers, Inc.  
ISBN 1-55860-666-1
- [24] A. Puder  
**Ubiquitous Computing Environments through Open Systems.**  
In *International Conference on Object Oriented Information Systems (OOIS)*, London.  
Springer-Verlag.
- [25] A. Puder and K. Römer  
**Middleware für verteilte Systeme.**  
dpunkt Verlag, Heidelberg  
ISBN 3-932588-03-7
- 2001 [26] M. Li, A. Puder, and I. Schieferdecker  
**A Test Framework for CORBA Interoperability.**  
In *5th IEEE International Enterprise Distributed Object Computing Conference (EDOC)*, Seattle.
- [27] A. Puder  
**CORBA Open Source Testing.**  
In *OMG in Motion*, Needham.
- 2002 [28] A. Puder  
**Middleware for Handheld Devices.**  
*AT&T Software Symposium*, Middletown.
- 2003 [29] A. Puder  
**Construction of Generic Web-Based User Interfaces.**  
In *Workshop on Human Computer Interface for Semantic Web and Web Applications*, Catania, Sicily, LNCS, Springer.
- 2004 [30] A. Puder  
**Extending Desktop Applications to the Web.**  
In *Second Workshop on Distributed Objects Research, Experiences & Applications (DOREA 2004)*, Las Vegas, ACM Proceedings.

- [31] A. Puder  
**MICO: An Open Source CORBA Implementation.**  
*IEEE Software*, Volume 21, Number 4, July/August 2004.
- 2005 [32] A. Puder  
**Cross-Language Functional Testing for Middleware.**  
*TestCom 2005*, Montreal, LNCS, Springer.
- [33] A. Puder, S. Desai  
**Accessing X Applications over the World-Wide Web.**  
*DOA 2005*, Agia Napa, Cyprus, LNCS, Springer.
- [34] A. Puder  
**An XML-based Cross-Language Framework.**  
*DOA 2005*, Agia Napa, Cyprus, LNCS, Springer.
- [35] A. Puder, K. Römer, and F. Pilhofer  
**Distributed Systems Architecture: A Middleware Approach.**  
Morgan Kaufmann, San Francisco  
ISBN 1-55860-648-3
- [36] A. Puder  
**XML11 - An Abstract Windowing Protocol.**  
*PPPJ Journal Special Issue*, Elsevier.
- 2006 [37] A. Puder  
**A Code Migration Framework for AJAX Applications.**  
*DAIS 2006*, Bologna, Italy, LNCS, Springer.

# Research Areas

## Graduate Studies (until 1993)

*Studies:* software engineering, formal languages, protocol specification, distributed systems; *Minor studies:* electrical engineering; *Master thesis:* "A Formal Security Model for *Message Handling Systems* (MHS)".

*Research Assistant:* Specification and implementation of a Security Interoperability Sublayer; Design and implementation of an object-oriented extension of the specification language SDL.

*Studies Abroad:* two terms at the University of Waterloo/Canada; Studies in realtime systems and compiler construction.

## Research Area 'Security' (1990-1993)

Development of a *Security Interoperability Layer* (SIS) between layers 3 and 4 of the ISO-OSI reference model as part of a government-funded project. SIS introduces security mechanisms such as encryption and authentication. The SIS-layer was to be designed in such a way that the API defined by X.213 remains unchanged. X.213 defines an interface between ISO-OSI layers 3 and 4. The design of the SIS protocol was implemented using the GEODE specification tool. The resulting prototype was tested over a TCP-network [1].

A formal security model for *Message Handling Systems* (MHS) according to X.400 was developed as a continuation of this project. Specification of a formal threat analysis based on the Bell-LaPadula-Model. As a requirement of the *Bundesamtes für Sicherheit in der Informationstechnik* (BSI) the threat analysis was specified through a formal model as well as mathematically verified according to the BSI security standard Q7 [2].

## Doctoral studies 'Service Trading' (1993-1997)

Development of a trading model for open distributed systems. Investigation of appropriate type specification languages for services [7], [8]. It was shown that in the context of open distributed systems type specifications are necessary at different levels of abstraction (system vs. user level). Furthermore no *a-priori* knowledge of existing type specifications can be assumed [4].

Development of a type specification language based on a knowledge representation technique [6], [9]. Definition of mapping rules for DCE-IDL and CORBA-IDL to and from the knowledge representation language [11]. Prototype implementation of a knowledge based trader including the IDL translators [16]. The work was later funded by the Deutsche Telekom AG, where the concept of a knowledge based trader was integrated into a TINA environment [17].

## Postdoctoral studies 'Architectures of middleware platforms' (1997-2002)

Development of a CORBA compliant implementation called MICO for research and educational purposes [18]. Based on a micro-kernel approach which moves extra functionality outside the *Object Request Broker* (ORB). Integration of ATM transport layer outside the ORB [20]. Development of a generic user interface to *a-priori* unknown object

types based on meta-data [14]. Three book publications describing the usage as well as the internal architecture of MICO by dpunkt-Publishers in Germany and Morgan Kaufmann Publishers in the US. MICO is branded as CORBA compliant by The Open Group and is widely used in industry and academia. First International MICO Workshop held in Germany, November 1998. Second International MICO Workshop held at Stanford University, March 2001.

## **Research Area 'Conformance Testing and Web-Applications' (2002-2005)**

First research area at the San Francisco State University is the conformance testing of middleware platforms. Project lead for the COST (CORBA Open Source Testing) effort at the OMG [27]. Development of a programming language independent method for functional testing based on XML [32], [34]. Second research area are web applications; amongst others a generic web-based user interface [29]. Automatic translation of desktop applications to web application [30], [33]. Specification of the XML11 protocol, inspired by the X-Windows protocol. XML11 is an XML-based, client-server abstract windowing protocol [36]. XML11 supports code migration of business logic to the client. This code migration framework is based on an XML-based programming language called XMLVM. XMLVM is modeled after the Java virtual machine and allows easy translation to other high-level programming languages such as JavaScript [34].

## **Research Area 'Embedded Systems and Sensor Networks' (since 2004)**

Another research area at the San Francisco State University are embedded systems and sensor networks. Agilent Labs funded a research project for measuring water quality of the San Francisco Bay. In cooperation with colleagues from the Romberg Tiburon Center we built an end-to-end application to deliver realtime sensor data to the desktop [37]. Sensor data is relayed to arbitrary consumers via a Sensor Management Framework (SMF) [38]. Use of Distributed Hash Tables (DHT) to build a multicast tree to guarantee a scalable architecture of the SMF [39]. This part of the project is funded by the National Science Foundation (NSF). The project has become known under the acronym NetBEAMS (Networked Bay Environmental Assessment Monitoring System) and has won the Duke Choice Award at the JavaOne 2005 convention. Our web page for Bay Area sensory data [www.netbeams.org](http://www.netbeams.org) is being adopted by other life science research groups along the Californian coast.

## **Teaching**

*Seminars/Term Projects:* Supervising of seminars in the area of object-oriented concepts in distributed systems as well as term projects in the area of distributed algorithms at the University of Frankfurt, Germany.

*Master thesis:* Supervising of several master thesis on various topics at the University of Frankfurt, Germany, the International Computer Science Institute, Berkeley, and the San Francisco State University.

*Lecturer position:* 3-units class on C++ and Java at the Applied University of Fulda, Germany (Fall 1996).

*Classes:* taught several 3-units classes at the San Francisco State University since Fall 2002:



- Introduction to Computer Programming (C++)
- Operating Systems
- Advanced Operating Systems
- Distributed Systems

# Industry Experience

## Fulltime Positions

- **University of Frankfurt, Germany:** Research staff member from 6/93 until 12/96. Worked on a government-funded project to develop an object-oriented software infrastructure supporting the cooperation in open, distributed systems. Organized graduate seminars. Supervised graduate students. co-PI on several industry-funded projects.
- **Deutsche Telekom AG:** Project Manager at the R&D center of Deutsche Telekom AG between 1/97 and 12/98. Worked on several projects in the context of the *Telecommunication Information Networking Architecture* (TINA):
  - Evaluation of the TINA-framework.
  - *Personal Communication Support* (PCS).
  - Access to TINA-Services via the Internet.

Worked as a Senior Project Manager for Deutsche Telekom AG in San Francisco between 1/99 and 12/00. Investigated security aspects for CORBA platforms and embedded systems for eCommerce applications. Ported MICO to PalmOS. Integrated SmartCard technology to PalmOS to enhance this platform for eCommerce applications. Cooperations with Stanford University in the context of the InterLib Project, where MICO is used as the communication infrastructure.

- **AT&T Labs:** Employment as a Senior Technical Staff Member between 1/2001 and 8/2002. Focus on middleware platforms for embedded systems. Ported MICO to Compaq's iPAQ and an XScale-based embedded system. Member of the AT&T Foundation Architecture, whose task is to issue company-wide guidelines for middleware technologies. Evaluation of Web Services standards as well as commercial products in that domain. Filed a patent for a generic middleware bridge.

## Industry Projects

Contract work for various German IT-companies.

- **TÜV-Rheinland:** Developed a graphical, interactive user interface that allows the definition of building floor plans as well as the location of noise emission points. The program computes the noise level at arbitrary locations of the floor plan. Implementation based on Turbo-Pascal.
- **StarDivision:** Development of Import/Export-filter for StarWriter 5.5. Converting of external formats (Word, RTF, WordPerfect) into the StarWriter-specific format. Implementation based on C and the StarWriter class libraries.
- **CSC Ploenzke AG:** Several projects in the domain of medical applications. Implementation based on C and C++ using OWL and MFC as GUI-libraries.

## Freelance Writer

Worked as a freelance writer for one of Germany's most influential IT-publisher, Heise Verlag. Several publications on different topics: product reviews [J1], [J3], [J4], [J10], [J18]; Convention reports [J5], [J11], [J13], [J14], [J15], [J16], [J17], [J19-J24]; Knowledge articles [J2], [J6], [J8]; Hands-on articles [J7], [J9], [J12].

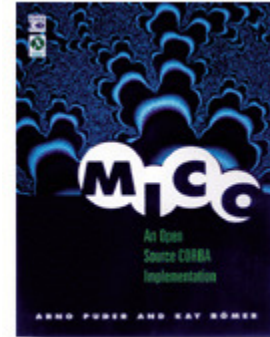
- 1994 [J1] A. Puder  
**Objektorientiertes Datenbanksystem mit drei Sprachschnittstellen: Versant 2.1.**  
 Produkt Review, iX, Heise Verlag, Heft 2, Seite 62
- [J2] A. Puder  
**OLE2: Microsoft's Object Linking and Embedding für zusammengesetzte Dokumente.**  
 Wissen, iX, Heise Verlag, Heft 6, Seite 54
- [J3] A. Puder  
**Objectivity/DB: Objektorientiertes Datenbanksystem auf C++-Basis.**  
 Produkt Review, iX, Heise Verlag, Heft 7, Seite 92
- [J4] A. Puder  
**Enfin: Smalltalk-Programmierungsumgebung mit Datenbankanschluß.**  
 Produkt Review, iX, Heise Verlag, Heft 7, Seite 84
- 1995 [J5] A. Puder  
**OO-Konferenz: Object Oriented Information Systems.**  
 Konferenzbericht, iX, Heise Verlag, Heft 2, Seite 8
- [J6] A. Puder  
**Smalltalk: Einführung, Konzept und Beispiele.**  
 Wissen, iX, Heise Verlag, Heft 2, Seite 114
- 1997 [J7] A. Puder et al  
**AI-Trader: wissensbasierter Dienstvermittler.**  
 Praxisbericht, iX, Heise Verlag, Heft 4, Seite 150
- [J8] A. Puder  
**Verteilte Objekte: DCOM versus CORBA.**  
 Wissen, iX, Heise Verlag, Heft 8, Seite 44
- 1998 [J9] A. Puder und K. Römer  
**MICO: Implementierungsdetails eines Object Request Broker.**  
 Praxisbericht, iX, Heise Verlag, Heft 5, Seite 154
- [J10] P. Averkamp, A. Puder, K. Römer, K. Auel  
**Von Big Blue bis GPL: Object Request Broker.**  
 Marktübersicht, iX, Heise Verlag, Heft 10, Seite 74
- [J11] A. Puder  
**TOOLS USA '98.**  
 Konferenzbericht, iX, Heise Verlag, Heft 10, Seite 16
- [J12] A. Puder  
**The MICO CORBA-compliant system.**  
 Praxisbericht, Dr. Dobb's Journal, Heft 11, Seite 44
- 1999 [J13] C. Kirsch und A. Puder  
**Open Source Convention und Perl Conference.**  
 Konferenzbericht, iX, Heise Verlag, Heft 10, Seite 10



# Book Publications

## MICO: An Open Source CORBA Implementation

*"MICO: An Open Source CORBA Implementation"*  
Arno Puder and Kay Römer  
Morgan Kaufmann Publishing, Inc.  
195 pages  
ISBN: 1-55860-666-1

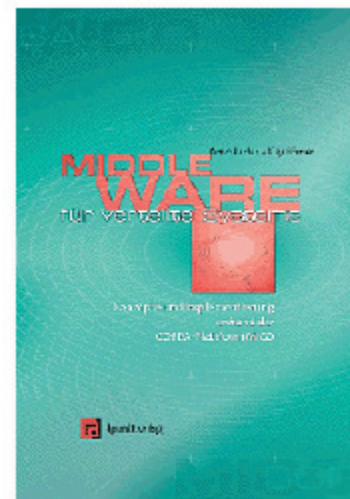


The book targets developers who use MICO to develop distributed applications based on CORBA. It explains the installation process of MICO as well as the usage of MICO based on several examples. A tutorial walks through a step-by-step procedure that shows how to implement a simple client/server application based on MICO. Later chapters explain implementation-specific details of MICO.

Table of Contents: (1) Introduction, (2) Installation, (3) CORBA Tutorial, (4) MICO Implementation Overview, (5) C++ Language Mapping, (6) Interoperability, (7) Naming Service, (8) Interface Repository, (9) License, (A) Sample Applications, (B) Frequently Asked Questions.

## Middleware für verteilte Systeme (in German)

*"Middleware für verteilte Systeme"* (in German)  
Arno Puder and Kay Römer  
dpunkt.verlag  
275 pages  
ISBN: 3-932588-03-7



This book discusses the internal architecture of a CORBA-based distribution platform. The design and architecture of a middleware platform are explained from two different point-of-views: that of an application programmer (who uses the middleware) and that of a system programmer (who implements the middleware). MICO is used as a case study to explain the principles of a micro-kernel architecture. This book also serves as a reference manual for the internal details of MICO.

Table of Contents: (1) Einleitung, (2) Grundlagen, (3) Einführung in CORBA, (4)  $\mu$ ORB, (5) Design des ORB, (6) Interoperabilität, (7) Objektadapter, (8) Aufrufadapter, (9) IDL-Compiler, (A) Weg eines Operationsaufrufs durch den ORB, (B) Einbindung eines neuen Aufrufadapters, (C) Einbindung eines neuen Objektadapters, (D) Einbindung eines neuen Transportmechanismus, (E) Struktur des generierten Programmkodes, (F) CORBA Standard, (G) Beispielanwendung.

## Distributed Systems Architecture: A Middleware Approach

*"Distributed Systems Architecture: A  
Middleware Approach"*

Arno Puder, Kay Römer and Frank Pilhofer

Morgan Kaufman

320 pages

ISBN: 1-55860-648-3

This book is a translated, extended and up-to-date version of the German book *"Middleware für verteilte Systeme"*. This book contains new chapters on the Portable Object Adapter (POA), the CORBA Component Model, Web Services as well as Ubiquitous Computing.

Table of Contents: (1) Introduction, (2) Basic Concepts, (3) Introduction to CORBA, (4)  $\mu$ ORB, (5) ORB Design, (6) Interoperability, (7) Object Adapters, (8) Invocation Adapters, (9) IDL-Compiler, (10) CORBA and Beyond, (A) MICO Installation, (B) MICO Implementation Overview, (C) MICO Implementation Details, (D) Sample Application.

