ER 2003, the 22nd International Conference on Conceptual Modeling in Chicago, Illinois, hosted four workshops on emerging and maturing aspects of conceptual modeling. While the entity-relationship approach is used to address data (base) modeling, the increasingly connected information infrastructure demands answers that can handle complexity and can develop models about systems that are maintainable. We received seven excellent proposals for workshops to be held at ER 2003, out of which we selected the following four based on peer reviews:

- Conceptual Modeling Approaches for E-Business (eCOMO 2003) brought together researchers and practitioners interested in conceptual modeling techniques for e-business.
- The International Workshop on Conceptual Modeling Quality (IWCMQ 2003) concentrated on approaches to quality assurance in the modeling process.
- The International Bi-Conference Workshop on Agent-Oriented Information Systems (AOIS 2003) was devoted to investigating the agent paradigm for information systems development.
- Finally, the International Workshop on XML Schema and Data Management (XSDM 2003) addressed the impact of XML on topics like data integration, change management, and the Semantic Web.

All four workshops highlighted relatively new viewpoints on conceptual modeling. Conceptual modeling as such has been greatly influenced and shaped by the entity-relationship model of Peter Chen. However, new developments like object-orientation and the World-Wide Web require adaptions and new techniques. No longer can developers assume that they can completely understand or model the information system. The new developments create challenges in various directions; some of these were discussed in detail in the four ER 2003 workshops:

**E-Business and E-Commerce.** The rise of the Internet has created new opportunities for defining and enacting business relations between partners. The question is how information systems can help in finding business partners, creating new services, and enacting those new services. Any lack of information about some business partners or their products and services needs to be compensated for using some kind of trust-building institution or mechanism. Moreover, services for e-business are not necessarily linked tightly together, as used to be the case for information systems developed for single enterprises. Can a service be modeled independently from the provider of the service who is selected at run time? Last but not least, one has to take into account different business (process) models, business contracts, and their monitoring. Hence, the field of e-business stresses the need for comprehensive modeling and analysis techniques.

**Model Quality.** Conceptual models are products of modeling processes undertaken by a group of human experts. Industrial quality management has shifted
from quality tests at the end of the production process to quality assurance over all product development steps, including the early stages of requirements analysis. The same idea is being applied to improving or at least assessing the quality of conceptual models and the related modeling processes that create them. The more that such models are abstracted from the final implementation, the more difficult it appears to be to assess and control their quality. What constitutes an error in a model? Can we distinguish useful parts of a conceptual model from not so useful parts? Certainly, a team of modelers who are aware of the quality of their products has better opportunities to improve than a team of modelers who are not assessing quality aspects at all. Still, the questions are: what aspects to measure, with which methods, and how frequently?

**Agent Orientation.** Object-orientation is a programming and modeling paradigm that aims at encapsulation (hiding internal details) and re-use (of code and models). While this paradigm is still successful and valid, the lack of information about some components of an information system makes it less applicable to loosely coupled system, like Web services or complex factories that are under constant evolution. Agent orientation provides a promising approach to deal with the increased complexity by including a flavor of autonomy into the components of an agent-oriented system: the co-operating agents have goals and they govern over multiple possible strategies to achieve their goals. The challenge from a conceptual modeling perspective is to represent agent systems in a way that makes them subject to analysis. Suitable languages from agent communication, goal representation, etc., are still under development.

**XML Data and Schema.** The last, but not least, topic covered by the ER 2003 workshops is XML. XML was, after the revolutionary rise of the Internet, in particular the World-Wide Web, an attempt to bring some order into the Web by tagging data elements with labels that indicate their interpretation (or schema). In a way, it is the global representation of interoperable data and perhaps processes. But does XML solve the problems of data/schema integration or does it just shift the problem to a new (yet uniform) syntax? XML databases are already on the market, including XML-based query languages. So, what parts of the traditional data modeling theory can be translated for the XML case?

The ER 2003 workshops addressed these issues and created a forum for fruitful discussions. The fact that three of the four workshops have already a long history shows that such discussions are long-term, and convincing answers will only appear after some time.

We thank our colleagues in the ER 2003 organization committee for their support. In particular, we thank the organizing chairs of the four workshops who came up with the ideas and imagination that made the workshop program at ER 2003 possible. Last but not least, our special thanks go to the paper authors and the reviewers who created the content of this volume and ensured its high quality.

October 2003

Manfred Jeusfeld

Óscar Pastor
ER 2003 Workshop Organization

General

ER 2003 Workshops Chairs  Manfred A. Jeusfeld  
Tilburg University, The Netherlands  
Óscar Pastor  
Politecnical University of Valencia, Spain

eCOMO 2003 Organization

Heinrich C. Mayr  University of Klagenfurt, Austria  
Willem-Jan van den Heuvel  Tilburg University, The Netherlands  
Christian Kop  University of Klagenfurt, Austria

IWCMQ 2003 Organization

Jim Nelson  Ohio State University, USA  
Geert Poels  Ghent University, Belgium  
Marcela Genero  Universidad de Castilla, Spain  
Mario Piattini  Universidad de Castilla, Spain

AOIS 2003 Organization

Paolo Giorgini  University of Trento, Italy  
Brian Henderson-Sellers  University of Technology, Sydney, Australia

XSDM 2003 Organization

Sanjay Madria  University of Missouri-Rolla, USA


VIII Organization

eCOMO 2003 Program Committee

Fahim Akhter
Zayed University, United Arab Emirates

Boldur Barbat
Lucian Blaga University, Sibiu, Romania

Boualem Benatallah
University of New South Wales, Sydney, Australia

Anthony Bloesch
Microsoft Corporation, USA

Antonio di Leva
University of Torino, Italy

Vadim A. Ermolayev
Zaporozhye State University, Ukraine

Marcela Genero
University of Castilla-La Mancha, Ciudad Real, Spain

Martin Glinz
University of Zurich, Switzerland

József Györkös
University of Maribor, Slovenia

Bill Karakostas
City University, London, UK

Roland Kaschek
Massey University, New Zealand

Stephen Liddle
Brigham Young University, USA

Zakaria Maamar
Zayed University, United Arab Emirates

Norbert Mikula
Intel Labs, Hillsboro, USA

Óscar Pastor
University of Valencia, Spain

Barbara Pernici
Politecnico di Milano, Italy

Matti Rossi
Helsinki School of Economics, Finland

Michael Schrefl
University of Linz, Austria

Daniel Schwabe
PUC-Rio, Brazil

Il-Yeol Song
Drexel University, Philadelphia, USA

Bernhard Thalheim
BTU, Cottbus, Germany

Jos van Hillegersberg
Erasmus University, Rotterdam, The Netherlands

Ron Weber
University of Queensland, Australia

Carson Woo
UBC, Vancouver, Canada

Jian Yang
Tilburg University, The Netherlands
IWCMQ 2003 Program Committee

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deb Armstrong</td>
<td>University of Arkansas, USA</td>
</tr>
<tr>
<td>Sjaak Brinkkemper</td>
<td>Baan, The Netherlands</td>
</tr>
<tr>
<td>Giovanni Cantone</td>
<td>University of Rome, Italy</td>
</tr>
<tr>
<td>Guido Dedene</td>
<td>Katholieke Universiteit Leuven, Belgium</td>
</tr>
<tr>
<td>Brian Henderson-Sellers</td>
<td>University of Technology, Sydney, Australia</td>
</tr>
<tr>
<td>Paul Johannesson</td>
<td>Stockholm University, Sweden</td>
</tr>
<tr>
<td>Barbara Kitchenham</td>
<td>Keele University, UK</td>
</tr>
<tr>
<td>John Krogstie</td>
<td>Sintef, Norway</td>
</tr>
<tr>
<td>Heinrich Mayr</td>
<td>University of Klagenfurt, Austria</td>
</tr>
<tr>
<td>Daniel Moody</td>
<td>Norwegian University of Science and Technology, Norway</td>
</tr>
<tr>
<td>Jim Nelson</td>
<td>Ohio State University, USA</td>
</tr>
<tr>
<td>Jeff Parsons</td>
<td>Memorial University of Newfoundland, Canada</td>
</tr>
<tr>
<td>Óscar Pastor</td>
<td>University of Valencia, Spain</td>
</tr>
<tr>
<td>Gustavo Rossi</td>
<td>National University of La Plata, Argentinia</td>
</tr>
<tr>
<td>Houari Sahraoui</td>
<td>Université de Montreal, Canada</td>
</tr>
<tr>
<td>Reinhard Schuette</td>
<td>University of Essen, Germany</td>
</tr>
<tr>
<td>Keng Siau</td>
<td>University of Nebraska-Lincoln, USA</td>
</tr>
<tr>
<td>Guttorm Sindre</td>
<td>Norwegian University of Science and Technology, Trondheim, Norway</td>
</tr>
<tr>
<td>Monique Snoeck</td>
<td>Katholieke Universiteit Leuven, Belgium</td>
</tr>
<tr>
<td>Bernhard Thalheim</td>
<td>Brandenburg University of Technology at Cottbus, Germany</td>
</tr>
</tbody>
</table>
AOIS 2003 Program Committee

B. Blake  
Georgetown University, Washington, DC, USA

P. Bresciani  
ITC-IRST, Italy

H.-D. Burkhard  
Humboldt Univ., Germany

L. Cernuzzi  
Universidad Católica Nuestra Señora de la Asunción, Paraguay

L. Cysneiros  
York University, Toronto, Canada

F. Dignum  
Univ. of Utrecht, The Netherlands

B. Espinasse  
Domaine Universitaire de Saint-Jérôme, France

I.A. Ferguson  
B2B Machines, USA

T. Finin  
UMBC, USA

A. Gal  
Technion, Israel Institute of Technology, Israel

U. Garimella  
Andra Pradesh Govt., MSIT, India

A.K. Ghose  
Univ. of Wollongong, Australia

G. Karakoulas  
CIBC and Univ. Toronto, Canada

K. Karlapalem  
Indian Inst. of Information Technology, India

L. Kendall  
Monash University, Australia

D. Kinny  
University of Melbourne

S. Kirn  
Techn. Univ. Ilmenau, Germany

M. Kolp  
Université catholique de Louvain, Belgium

N. Jennings  
Southampton University, UK

G. Lakemeyer  
RWTH Aachen, Germany

Y. Lespérance  
York University, Canada

D.E. O’Leary  
Univ. of Southern California, USA

F. Lin  
Hong Kong Univ. of Science and Technology, Hong Kong

J.P. Mueller  
Siemens, Germany

J. Odell  
James Odell Associates, USA

O.F. Rana  
Cardiff University, UK

M. Schroeder  
City University London, UK

N. Szirbik  
Technische Universiteit Eindhoven, The Netherlands

F. Zambonelli  
University of Modena and Reggio Emilia, Italy

C. Woo  
Univ. British Columbia, Canada

Y. Ye  
IBM T.J. Watson Research Center, USA

B. Yu  
North Carolina State University, USA
XSDM2003 Program Committee

Elisa Bertino
Bharat Bhargava
Sourav Bhowmick
Tiziana Catarci
Qiming Chen
Chakravarthy Sharma
Kajal Claypool
Ee-Peng Lim
David W. Embley
Alberto H.F. Laender
Le Gruenwald
Mengchi Liu
Qing Li
Mukesh Mohania
Wee-Keong Ng
Stefano Paraboschi
Giuseppe Psaila
Elke A. Rundensteiner
Kian-Lee Tan
Katsumi Tanaka
Christelle Vangenot
Osmar R. Zaiane
Xiaofang Zhou

Universitá di Milano, Italy
Purdue University, USA
Nanyang Technological University, Singapore
Università degli Studi di Roma “La Sapienza,”
Italy
Commerce One, USA
University of Texas, Arlington, USA
University of Massachusetts, Lowell, USA
Nanyang Technological University, Singapore
Brigham Young University, USA
UFMG, Brazil
University of Oklahoma, USA
Carleton University, Canada
City University of Hong Kong, China
IBM Research Lab, India
Nanyang Technological University, Singapore
University of Bergamo, Italy
University of Bergamo, Italy
Worcester Polytechnic Institute, USA
National University of Singapore, Singapore
Kyoto University, Japan
EPFL, Switzerland
University of Alberta, Canada
University of Queensland, Australia

External Referees

Gajanan Chinchwadkar
Farshad Fotouhi
Lars Olsen

Muhammed Al-Muhammed
Conceptual Modeling for Novel Application Domains
ER 2003 Workshops ECOMO, IWCMQ, AOIS, and XSDM,
Chicago, IL, USA, October 13, 2003, Proceedings
Jeusfeld, M.A.; Pastor, Ó. (Eds.)
2003, XVI, 414 p., Softcover
ISBN: 978-3-540-20257-8