

Proceedings of the Sixth International Conference on CSCW in Design

July 12 – 14, 2001
London, Ontario, Canada

Edited by:

**Weiming Shen
Zongkai Lin
Jean-Paul Barthès
Mohamed Kamel**

Sponsors:

NRC - CNRC
National Research Council Canada



IEEE Canada and IEEE London/Canada Section


Western
University of Western Ontario

University of
Waterloo

University of Waterloo

Published by National Research Council Canada

ISBN 0-660-18379-X
NRC Publication No.:

© 2001 National Research Council of Canada

Weiming Shen, Zongkai Lin, Jean-Paul Barthès, Mohamed Kamel

Proceedings of the Sixth International Conference on CSCW in Design

International Steering Committee

Chair: Prof. Zongkai Lin (China)
Co-Chair: Prof. Jean-Paul Barthès (France)
Secretary: Dr. Minzhe Zhao (Singapore)
Members: Prof. Igor Hawryszkiewicz (Australia)
Dr. Karl R. Lang (Hong Kong)
Prof. Mary Lou Maher (Australia)
Prof. Jay Nunamaker (USA)
Prof. Hwa Gyoo Park (Korea)
Dr. Weiming Shen (Canada)
Prof. Gilbert Young (Hong Kong)

Organizing Committees

General Conference Chair:
Dr. Mohamed Kamel (Univ. of Waterloo, Canada)

Vice Conference Chairs:
Dr. Sherman Lang (NRC-IMTI, Canada)
Dr. Rajni Patel (UWO, Canada)
Prof. Haicheng Yang (NWPU, P.R. China)
Mr. Ashfaq Husain (IEEE London/Canada)

Program Committee Chairs:
Dr. Weiming Shen (NRC-IMTI, Canada)
Prof. Zongkai Lin (Chinese Academy of Sciences)
Prof. Jean-Paul Barthès (UTC, France)

Financial Committee Chair:
Dr. Lihui (Ian) Wang (NRC-IMTI, Canada)

Workshops Chairs:
Dr. Hamada Ghenniwa (UWO, Canada)
Dr. Paul Woodard (NRC-IMTI, Canada)

Publication Chair:
Mr. Vibhor Gupta (NRC-IMTI, Canada)

Publicity Chair:
Dr. Zakaria Maamar (Zayed U., UAE)

Local Arrangement Chair:
Dr. Ralph Buchal (UWO, Canada)

Local Arrangement Committee Members:
Brian Corrie (NRC-IMTI, Canada)
John Dickinson (NRC-IMTI, Canada)
Costantino Mongelli (NRC-IMTI, Canada)
Ajit Pardasani (NRC-IMTI, Canada)
Gail Percy (NRC-IMTI, Canada)
Helen Xie (NRC-IMTI, Canada)

Program Committee Members:

Wil van der Aalst (NL)
Marcos Borges (BR)
Carlos Bremer (BR)
Ralph Buchal (CA)
Catherine Burns (CA)
Paul Calamai (CA)
Luis Camarinha-Matos (PT)
Alvin Chan (HK)
Stephen Chan (HK)
Li Chen (CA)
Chin-Jung Chen (US)
To-Yat Cheung (HK)
Moon Jung Chung (US)
Jiati Deng (CN)
Roberto DiRrado (CA)
Jinxiang Dong (CN)
Zuming Dong (CA)
Shaw Feng (US)
Rajit Gadh (US)
Hamada Ghenniwa (CA)
Dan Grecu (US)
Ning Gu (CN)
Yuchai Guo (CN)
Igor Hawryszkiewicz (AU)
Yeh-Liang Hsu (TW)
George Huang (HK)
Anne James (UK)
Jano Moreira de Souza (BR)
Michael Johnson (AU)
Catholijn Jonker (NL)
Mohamed Kamel (CA)
Mark Klein (US)
Laryy Korba (CA)
Rob Kremer (CA)
Ernest Lam (HK)
Karl Lang (HK)
W.B. Lee (HK)
Tae-Eog Lee (KR)
Tangqiu Li (CN)
Shouxin Lin (CN)
Hong Liu (CN)
Kecheng Liu (UK)
Jian Lu (FR)
Junzhou Luo (CN)
Carolyn MacGregor (CA)
Mary Lou Maher (AU)
K.L. Mak (HK)
Zakaria Maamar (AE)
Tsutomu Matsumoto (JP)
Vincent Ng (HK)
Jay Nunamaker (US)
Eugenio Oliveira (PT)
Vaggelis Ouzounis (DE)
Zhigeng Pan (CN)
Hwa Gyoo Park (KR)
Yun Peng (US)
Bruno Ramond (FR)
Ramana Reddy (US)
Paul Rodgers (UK)
Edson Scalabrin (BR)
Meilin Shi (CN)
Yuanchun Shi (CN)
Haitao Song (CN)
Shunlin Song (CN)
Ram D. Sriram (US)
Yong Tang (CN)
Michael Terk (US)
Francis Thibault (CA)
Huaglory Tianfield (UK)
Tetsuo Tomiyama (JP)
Brigitte Trousse (FR)
Patri Venuvinod (HK)
Haiyang Wang (CN)
Shaomei Wang (CN)
Hong Xu (CN)
Deyi Xue (CA)
Chenhui Yang (CN)
Gilbert Young (HK)
K.M. Yu (HK)
Jyh-Cheng Yu (TW)
Matthew Yuen (HK)
Chris Zhang (CA)
Fuyan Zhang (CN)
Minzhe Zhao (SG)
Diji Zhou (CN)
Yu Zhou (CN)
Khaldoun Zreik (FR)

Preface

Welcome to the Sixth International Conference on Computer Supported Cooperative Work in Design (CSCWD 2001).

Design of complex artifacts and systems requires the cooperation of multidisciplinary design teams. CSCWD 2001 provides a forum for researchers and practitioners involved in different but related domains to confront research results and discuss key problems. The major topics of CSCWD 2001 include the following:

- Techniques, methods, and tools for CSCW in design;
- Social organization of the CSC process;
- Integration of methods and tools within the work organization;
- Cooperation in virtual enterprises and e-businesses
- CSCW in Design and Manufacturing
- Interaction between the CSC approach and knowledge reuse as found in knowledge management;
- Intelligent agent and multi-agent systems;
- Internet/Web and CSCW in design;
- Applications and testbeds.

The Technical Program Committee has developed an exciting and provocative technical program that includes 29 technical sessions (contributed and invited), with papers from over 18 countries.

We would like to thank all members of the Program Committee for their effort in promoting the conference and carefully reviewing the submitted papers. Special thanks are due to the authors who contributed to this conference.

We would also like to thank the chairs and members of the organizing committee for taking care of all the details to make this conference successful. We acknowledge the sponsorship of National Research Council Canada, IEEE Canada and IEEE London/Canada through seed funding. We gratefully appreciate the support we received from the staff of the Conference Services at the University of Western Ontario during the conference preparation and organization.

Special thanks to Leah Paterson who provided a great help during the preparation of the conference and the editing of the conference proceedings.

Weiming Shen

Integrated Manufacturing Technologies Institute
National Research Council Canada
London, Ontario, Canada

Zongkai Lin

Institute of Computing Technology
Chinese Academy of Sciences
Beijing, P.R. China

Jean-Paul. A. Barthès

CNRS UMR 6599 HEUDIASYC
Université de Technologie de Compiègne,
France

Mohamed Kamel

Dept. of Systems Design Engineering
University of Waterloo
Waterloo, Ontario, Canada

Contents

Part I: Keynote Papers	1
<u>Design Repositories and Product Representation for Collaborative Product Development</u> <i>Ram D. Sriram, Simon Szykman</i>	3
<u>What Complex Systems Research Can Teach Us About Collaborative Design</u> <i>Mark Klein, Hiroki Sayama, Peyman Faratin, Yaneer Bar-Yam</i>	5
Part II: CSCW	13
<u>A Method for Specification of Collaborative Interfaces through the Use of Scenarios</u> <i>Anamaria Montandon Dumont, Carlos Alberto Marques Pietrobon</i>	15
<u>An Event and Service Interacting Model and Event Detection Based on the Broker/Service Model</u> <i>Ping-peng Yuan, Gang Chen, Jin-xiang Dong, Wei-li Han</i>	20
<u>The Design and Implementation of a Real-time Walkthrough System Supporting Cooperative Manipulation</u> <i>Hongmei Sun, Shenquan Liu</i>	25
<u>Supporting Cooperation with Off-the-Shelf Applications in Wired and Wireless Networks</u> <i>Federico Bergenti, Agostino Poggi, Matteo Somacher</i>	30
<u>Supporting Group Awareness in Collaborative Design</u> <i>Yan Liu, Yuanchun Shi, Guangyou Xu</i>	36
<u>Improving the Selectivity of Awareness Information in Groupware Applications</u> <i>José Maria N. David, Marcos R. S. Borges</i>	41
<u>Consistency Control in Synchronous Cooperative Work</u> <i>Lei Yu, Zongkai Lin, Yuchai Guo, Shouxun Lin</i>	47
<u>Research on Cooperative Template Design</u> <i>Xiao-ping Liu, Xiao-yun Liu, Zheng-feng Hou, Xiao-rong Du</i>	52
<u>X-Arc Spatial Data Integration in the SPeCS Collaborative Design Framework</u> <i>Gustavo da R. B. Pinto, Sergio Palma J. Medeiros, Julia Celia M. Strauch, Jano Moreira de Souza, Carlete R. F. Marques</i>	56
<u>Managing Dynamic Shared State in Virtual Space for Collaborative Design</u> <i>Lilly Li, Chenhui Yang, Tangqiu Li</i>	61
<u>Collaborative Technique Integration in Knowledge-Based System</u> <i>Kuo-Wei Su, Thu-Hua Liu, Sheue-Ling Hwang</i>	66
<u>On Sharing of Objects in Concurrent Design</u> <i>Aiko Frank, Bernhard Mitschang</i>	71
<u>A Web-based Collaborative Workspace Using Java 3D</u> <i>Lihui Wang, Brian Wong, Weiming Shen, Sherman Lang</i>	77
<u>Multi-user Shared Virtual Reality in the Exhibition of Chinese Nationalities</u> <i>Jun Zhang, Fengsen Li, Hua Li</i>	83

<u>Integrity Validation for Object Versions in a Co-operative Design Environment</u> <i>J.S.Goonetillake, T.W.Carnduff, W.A. Gray</i>	89
<u>Towards Distributed Privacy for CSCW</u> <i>Larry Korba</i>	95
<u>A New Algorithm of Collision Detection in Shared Space for Collaborative Design</u> <i>Chenhui Yang, Lilly Li, Tangqiu Li</i>	102
<u>System Model and Implementation of Constraint-Based Distributed Intelligent Conceptual Design System</u> <i>Yurong Xu, Shouqian Sun, Zongkai Lin, Yingxin Zhao</i>	109
<u>Collaborative Discussion and Decision-Support in a Manufacturing Organization</u> <i>André Marcos da Silva, Rodrigo Bonacin, M. Cecilia C. Baranauskas</i>	117
<u>Cooperation as a Communication process</u> <i>Jean-Philippe Kotowicz, Xavier Briffault</i>	123
<u>A Novel Method for Image Retrieval in Distributed Multimedia System</u> <i>S.X. Sun, T.Y. Huang, C.Y. Pang</i>	129
<u>Synergetic Collaboration in Networked Virtual Reality System</u> <i>Yi Chen, Shouyi Zhan, Pengfei Li</i>	135
<u>The Development Tool of the Application Cooperation Software</u> <i>Zhigang Zhang, Zongkai Lin, Yuchai Guo</i>	140
<u>The Control and Algorithm of Audio Dynamic Buffer</u> <i>Chongjia Peng, Yong Tang, Xianji Li, Chengjie Mao</i>	143
<u>T.120/H.32x-based Multimedia Conferencing Design</u> <i>Minzhe Zhao, Mingshu Li</i>	146
<u>Research on Adaptive IP QoS Management Framework</u> <i>Yong Tang, Chengjie Mao, Hai-xiang Ou, Xue-liang Yang, Xianji Li</i>	149
<u>Research on Shared Objects Cooperative Manipulating Systems</u> <i>Wei Li, Hantao Song, Yisong Jiang</i>	153
<u>HDBIS Supporting E-Collaboration in E-Business</u> <i>Lizhen Liu, Hantao Song, Yanmei Liu</i>	157
Part III: Collaborative Design	161
<u>Co-DARFAD—the Collaborative Mechanical Product Design System</u> <i>Kezheng Huang, Xudong Li, Shukun Cao, Bo Yang, Wei Pan</i>	163
<u>Sharing Learning in a Cooperative Design System</u> <i>Hong Liu, Xiyu Liu</i>	169
<u>Tracking of Design Changes for Collaborative Product Development</u> <i>Helen Xie</i>	175

<u>Towards Collaborative Design in an Open Hypermedia Environment</u>	181
<i>David L. Hicks, Uffe Kock Wiil</i>	
<u>An Overview of Cognitive Factors in Distributed Design</u>	190
<i>Sherman Lang, John Dickinson, Ralph Buchal</i>	
<u>Design and Implementation of an Intelligent Cooperative Design System</u>	198
<i>Pengcheng Zhang, Renhou Li</i>	
<u>A Visual Part Library – GS-PM</u>	203
<i>Min Tang, Xinyu Tang, Jinxiang Dong</i>	
<u>Parametric Modeling with User-defined Features</u>	207
<i>Min Tang, Ye Wen, Xiaofeng Mi, Jinxiang Dong</i>	
<u>Collaborative Model for Concurrent Product Design</u>	212
<i>Peng Song, Min Tang, Jinxiang Dong</i>	
<u>A Framework and Implementation Techniques for Cooperative Architectural Engineering Design Systems</u>	218
<i>Weiyu Wu, Peng Pan, Hua Li, Wei Yu, Dongmei Liang</i>	
<u>Volume Modelling in a Feature Based Product Modeling System</u>	223
<i>Min Tang, Chentao Yu, Jinxiang Dong</i>	
<u>AI Supported Computer-Generated Pen-and-Ink Illustration</u>	227
<i>Yan Gu, Songhua Xu, Min Tang, Jinxiang Dong</i>	
<u>Research on Network Based Conceptual Design</u>	232
<i>Cuixia Ma, Hongan Wang, Guozhong Dai</i>	
<u>Cooperative Product Design Process Modeling</u>	236
<i>Gang Zhao, Jiati Deng</i>	
<u>Supporting Negotiation in Concurrent Design Teams</u>	243
<i>Robin Barker, Leigh Holloway, Anthony Meehan</i>	
<u>A Case Study on Distributed, Collaborative Design: Investigating Communication and Information Flow</u>	249
<i>Steven P. MacGregor, Avril I. Thomson, Neal P. Juster</i>	
<u>POPIM: Pragmatic Online Project Information Management for Collaborative Product Development</u>	255
<i>GQ Huang, XB Feng, KL Mak</i>	
<u>Web based Product Design Review: Implementation Perspective</u>	261
<i>GQ Huang, KL Mak, JY Shen, JQ Yan</i>	
<u>Web-based Concurrent Design Using a Distributed System and Database Modeling Approach</u>	267
<i>D. Xue, Y. Xu</i>	
<u>An Optimal Concurrent Design Model Using Distributed Product Development Life-cycle Databases</u>	273
<i>F. Zhang, D. Xue</i>	
<u>A Data-Centric Distributed Framework for MDO Management</u>	279
<i>Bin Chen, DaoJun Liu, Babak Mahdavi, Qun Zhou, Djamel Bouhemhem, Amadou Ndiaye, François Guibault, Benoît Ozell, Dominique Pelletier, Jean-Yves Trépanier</i>	

Part IV: Agents and Multi-Agent Systems **285**

[Agent-Supported Portals and Knowledge Management in Complex R&D Projects](#) 287
Jean-Paul. A. Barthès, Cesar Tacla

[Web Agents for Spatial Mining on Air Pollution Meteorology](#) 293
Vincent Ng, Stephen C F Chan, Sandra Au

[Implementation of Multi-Agent System Based on CORBA and COM](#) 299
Xinming Tan, Shaomei Wang

[Exception Handling and Structure Recasting in Distributed Process-Oriented Information Systems](#) 303
Hong Xu, Guang Shu, Diji Zhou, Qingzhong Lu

[Research on Multi-Agent for General Group Decision Support System](#) 308
Chaozhen Guo, Wu Dong, Jia Wu

[A Strong Migration Method of Mobile Agents Based on Java](#) 313
Hong Wang, Guangzhou Zeng, Shouxun Lin

[CoDesign - A Collaborative Pattern Design System Based on Agent](#) 319
Bo Jiang, Chun Chen, Jiajun Bu

[Of Networks, Interactions and Agents: An Approach for Social Network Analysis](#) 324
P. Temdee, L. Korba

[A Dynamic Web Agent for Verifying the Security and Integrity of a Web Site's Contents](#) 330
Soroush Sedaghat, Josef Pieprzyk, Ehsan Vossough

[A Framework for Intelligent Agents within Effective Concurrent Design](#) 338
Kuo-Ming Chao, Anne James, Peter Norman

[Research on Integrated Model Based on XML, CORBA and Agent](#) 344
Hong Guo, Rui Chen, Li-ming Hu

[Architectural Properties of CSCWD System Based on Multi C²D²-Agent](#) 349
Xiaosu Zhan, Zongkai Lin, Guang Xu, Yuchai Guo, Mingye Liu, Meilong Ye

[Agent-Based Cooperative NC Conceptual Design](#) 354
Zhigang Xu, Kezheng Huang, Weimin Liu

[Cooperative Work Mechanism in UUHDB System Based on MAS](#) 358
Lei Ma, Mingye Liu, Hantao Song

[The Modeling of Cooperative Environment in Digital Video Recorder Monitoring Control System](#) 362
Dan Sun, Hantao Song

Part V: Databases **365**

[Update Algorithms for the Sketch Data Model](#) 367
Michael Johnson, Robert Rosebrugh

[Database Support for Evolving Data in Product Design](#) 377
Dietmar Posselt, Gerd Hillebrand

<u>On Processing Cycle Query's Strategy for Semistructure Data Model and Its Role in Design</u>	384
<i>Jialin Le, Xuemin Lin</i>	
<u>A Main Memory Database Method Supporting Synchronous Cooperative Application</u>	389
<i>Qiujing Li, Yuchai Guo, Zongkai Lin, Shouxun Lin</i>	
Part VI: Workflow Management Systems	395
<u>Product-driven Workflow Design</u>	397
<i>W.M.P. van der Aalst, H.A. Reijers, S. Limam</i>	
<u>Workflow Interoperability – Enabling E-Business</u>	403
<i>Yan Zhang, Meilin Shi, Chunyu Miao, Zixin Zhuang, Xinxiang Chen</i>	
<u>An Object-Oriented Modeling Method for Workflow Applications</u>	409
<i>Jingzhou Li, Haiyang Wang</i>	
<u>CovaFlow: a General Workflow System by Cova</u>	414
<i>Jinlei Jiang, Yan Wu, Meilin Shi</i>	
<u>Integration of Workflow and Agent Technology for Business Process Management</u>	420
<i>Yuhong Yan, Zakaria Maamar, Weiming Shen</i>	
<u>Verification of XRL: An XML-based Workflow Language</u>	427
<i>W.M.P. van der Aalst, H.M.W. Verbeek, A. Kumar</i>	
<u>Modeling Workflow within Distributed Systems</u>	433
<i>Yuhong Yan, Alex Bejan</i>	
<u>A Workflow System for Supporting Group Activities of an Enterprise</u>	440
<i>Feng Li, Zongkai Lin, Yuchai Guo, Jintao Li</i>	
<u>Collaborative Modeling and Simulation for Order Management in Virtual Enterprise</u>	444
<i>Xiaoming Zhang, Ziqiong Deng, Hongze Ma</i>	
Part VII: E-Business/E-Commerce and Virtual Enterprises	449
<u>An Agent-based Life Cycle Management for Dynamic Virtual Enterprises</u>	451
<i>Vaggelis K. Ouzounis, Volker Tschammer</i>	
<u>Research and Development of Electronic Commerce System—ESHOPDIY</u>	460
<i>Xiufen Fu, Yong Tang, Jing Wang</i>	
<u>Virtual Supply Chain Management: Information Framework and Agreement Network Model</u>	466
<i>Charu Chandra, Alexander V. Smirnov</i>	
<u>Business to Business Standard and Supply Chain System Framework in Virtual Enterprises</u>	472
<i>Deren Chen</i>	

Part VIII: Distance Learning	477
<u>Cooperative Mechanism for Real Time Long-distance Teaching System</u> <i>Junzhou Luo, Jianxiang Wei, Huasong Xu</i>	479
<u>CSCL: An Internet Based Education Model</u> <i>Shengjun Xue, Ran Tan, Hua Huang</i>	483
<u>Integrated Process Design for E-Learning: A Case Study</u> <i>Hartini Ahmad, Zulkifli Mohamed Udin, Rushami Zien Yusoff</i>	488
<u>Extracting WEB Table Information in Cooperative Learning Activities Based on Abstract Semantic Model</u> <i>Ning Gu, Guowen Wu, Xiaoyuan Wu, Baile Shi</i>	492
<u>A Cooperative System for Multimedia Courseware Evaluation</u> <i>Ming Zuo, Xiaotian Zhu</i>	498
<u>A Teaching Support Program for Distance Learning</u> <i>Xiaotian Zhu, Zhijian Huang, Yanchun Ma, Ming Zuo</i>	502
<u>Cultivating a Community of Practice: Designing the TeleLearning Exchange</u> <i>Griff Richards, Tom Calvert, Aude Dufresne, Lyn Bartram, Marek Hatala</i>	506
<u>An Interactive Multimedia-Board</u> <i>Junzhou Luo, Huasong Xu, Jianxiang Wei</i>	511
<u>Cooperative Work in Multimedia Network Teaching System</u> <i>Shaozi Li, Tangqiu Li, Liying Wang</i>	517
<u>MA-C: A Multimedia Instruction Model based on Multi-Agent and CSCW</u> <i>Shenkang Wang, Qinming He, Chunyang Yu</i>	520
Part IX: Applications	523
<u>Telematic Applications for Supporting Telework Related Activities</u> <i>Joseph Barjis, Boris Shishkov</i>	525
<u>Analysis and Modeling of Cooperative Processes in Dynamic and Complex Environments</u> <i>Francine Merat-Bodin, Tahar Hakim Benchekroun</i>	530
<u>Paperless in the Electronic Era: Millennium Dream and Reality</u> <i>Azmi Mohd Yusoff, Manjit Singh Sidhu</i>	536
<u>A New CSCW Prototype System for Color CRT CAD/CAM</u> <i>Yuxiu Cao, Chunxiao Xing, Long Tang, Lizhu Zhou</i>	542
<u>Designing and Implementation of Tele-Health Care Information System based on Health Care Model</u> <i>Tsutomu Matsumoto, Toshikatsu Mori, Hirofumi Ohtsuka, Yasuyuki Shimada, Shigeyasu Kawaji</i>	546
<u>New Multimedia Telecommunication Technologies and CSCW for Telemedicine</u> <i>Wenhua Huang, Yuhua Ai, Shizhen Zhong, Qingan Zhu, Weidong Zhao, Lin Yuan, Zhenyu Chen, Jingdong Yan, Zhexing Liu</i>	551

<u>CSCW Based Telemedicine on the Internet</u> <i>Seok-Soo Kim, Dae-Joon Hwang</i>	554
<u>Design and Implementation of a Communication Mechanism for WEBGIS Based on a Distributed Component Model</u> <i>Chaozhen Guo, Qingming Wang, Yuan Xu</i>	558
<u>Computer Supported Force Analysis and Layer Imagine for Masked Rapid Prototyping System</u> <i>You-Min Huang, Jeng-Ywan Jeng, Cho-Pei Jiang, Jia-Chang Wang</i>	562
<u>Intelligent Assembly Modeling Based on Semantics Knowledge in Virtual Environment</u> <i>Jianrong Tan, Zhenyu Liu, Shuyou Zhang</i>	568
<u>Development of a Web-Based Academic Time Management System</u> <i>Zulkifli Mohamed Udin, Ahmad Suki Che Mohamed Arif, Azmi Md Saman</i>	572
<u>Transformation of Binary Relations</u> <i>Jamal Said, Eric Steegmans</i>	575
Author Index	581