

Proceedings of the First International Symposium on
**Knowledge Management for Strategic Creation
of Technology**

March 8-10, 2004

Ishikawa High-Tech Exchange Center

2-1 Asahidai, Tatsunokuchi, Ishikawa 923-1211, Japan

Organized by

The 21st Century COE Program

Technology Creation Based on Knowledge Science

Japan Advanced Institute of Science and Technology

Preface

JAIST has started a research program “**Technology Creation Based on Knowledge Science: Theory and Practice**” as one of the center of excellence programs (21st century COE programs) supported by Ministry of Education, Culture, Sports, Science and Technology, Japan. The knowledge base that supports technological creation may well be the most valuable infinite resource in our society. Thus, it is vital to begin to continuously and systematically develop the theory of technology creation, verifying the theory in scientific laboratories, and improving the theory by feedback from practice. This program will apply **Knowledge Science** to the fields of important natural sciences to help researchers produce creative theoretical results. With respect to education, we will train excellent graduate students to become **knowledge coordinators** who can manage creative research activities and **knowledge creators** who have advanced research and development capabilities.

JAIST has established the **Center for Strategic Development of Science and Technology** where scientific technology development strategies can be developed in cooperation with outside research organizations. At the same time, we are planning to develop an educational system (which we tentatively call **Department of Scientific Knowledge Creation**) that fully demonstrates the synergistic effect of combining the different fields. This system will continuously create scientific knowledge, offering an advanced model for setting important research priorities and promoting research and development, and thereby affecting management of research and development in other universities, research institutions, and enterprises.

This international symposium is held as one of the activities of the COE program by inviting distinguished researchers or educators in this field from all over the world. The topics include knowledge management in strategic development of science and technology, systems methodologies for managing interdisciplinary research projects, management of technology in the context of industry-university cooperation, educational programs for raising coordinators of technology development, laboratory management for raising creators of scientific technology, and information technology for supporting the above, for instance, data management system, document management system, electronic content management, integrate collaborative environment, electronic laboratory notebook, etc.

Yoshiteru Nakamori

Program Leader

Japan Advanced Institute of Science and Technology

Table of Contents

Technology Creation Based on Knowledge Science.....	1
Yoshiteru NAKAMORI (School of Knowledge Science, JAIST)	
Masahiro TAKAGI (School of Material Science, JAIST)	
Knowledge Theory at the Beginning of the Civilisation Era of Informational and Knowledge Economy.....	11
Andrzej P. WIERZBICKI (National Institute of Telecommunications, Poland)	
Creativity Holism: Systems Thinking for Managers.....	29
Michael C. JACKSON (University of Hull, UK)	
Complementarism vs. Pluralism: Are They Different and Does It Matter?.....	32
Zhichang ZHU (University of Hull, UK)	
The Communicatics Model and Its Application in Knowledge Science.....	50
Jason Jixuan HU (WINTOP Consulting Group, USA)	
Meta-Synthesis Systems Approach to Knowledge Science.....	86
Jifa GU (Chinese Academy of Sciences, China)	
Xijin TANG (Chinese Academy of Sciences, China)	
Systems Thinking for Inter-Disciplinary Dialogue.....	94
V.E. BAKER, J.L. Foote and J.E.GREGOR	
(Institute of Environmental Science and Research(ESR)Ltd., New Zealand)	
D.J. HOUSTON (Massey University, New Zealand)	
Gerald MIDGLEY (Institute of Environmental Systems Research, New Zealand)	
Knowledge Network System: Not Only a Tool, But a Paradigm.....	117
Zhongtuo WANG (Dalian University of Technology, China)	

A Nonmonotonic-inference Integrated Framework for Decision Support.....	128
Jian CHEN and S. Y. PENG (Tsinghua University, China)	
Augmented Support for Idea Generation for Decision Making.....	136
Xijin TANG and Yijun LIU (Chinese Academy of Sciences, China)	
Knowledge Creation through Integration of Web-based Computational Models.....	144
Haoxiang XIA (Dalian University of Technology, China)	
Steven KRAINES (University of Tokyo, Japan)	
David WALLANCE (University of Tokyo, Japan)	
Zhongtuo WANG (Dalian University of Technology, China)	
Improving the Retrieval Effectiveness by Integrating Modification-words with Headword.....	149
Jiangning WU (Dalian University of Technology, China)	
Hiroki TANIOKA (JUST SYSTEM, Japan)	
Shizhu WANG (JUST SYSTEM, Japan)	
Kenichi YAMAMOTO (JUST SYSTEM, Japan)	
Donghua PAN (Dalian University of Technology, China)	
Zhongtuo WANG (Dalian University of Technology, China)	
A Framework and Infrastructure of Enterprise Knowledge Portal.....	155
Donhua PAN (Dalian University of Technology, China)	
Process Knowledge and Its Acquiring Method.....	159
Weisen GUO and Yanzhong DANG (Dalian University of Technology, China)	
A Method of Management of the Knowledge for SARS Emergency Control.....	165
Lili RONG (Dalian University of Technology, China)	