

## Preface

This volume contains the papers selected for presentation at the Third International Conference on Rough Sets and Current Trends in Computing (RSCTC 2002) held at Penn State Great Valley, Malvern, Pennsylvania, U.S.A., 14–16 October 2002. Rough set theory and its applications constitute a branch of soft computing that has exhibited a significant growth rate during recent years. RSCTC 2002 provided a forum for exchanging ideas among many researchers in the rough set community and in various areas of soft computing and served as a stimulus for mutual understanding and cooperation. In recent years, there have been a number of advances in rough set theory and applications. Hence, we have witnessed a growing number of international workshops on rough sets and their applications. In addition, it should be observed that one of the beauties of rough sets and the rough set philosophy is that it tends to complement and reinforce research in many traditional research areas and applications. This is the main reason that many international conferences are now including rough sets into the list of topics.

It is our great pleasure to dedicate this volume to Professor Zdzislaw Pawlak, who created rough set theory over twenty years ago. The growth of rough set theory and applications owes a great deal to Professor Pawlak's vibrant enthusiasm and wit as well as his great generosity towards others, especially in encouraging and advising beginners in rough sets. The depth, breadth, and richness of current rough set research are directly traceable to Professor Pawlak's inventiveness and the richness of his many insights and ideas concerning data mining, machine learning, logic, and mathematics. The computational features of rough sets are also giving rise to new forms of neurocomputing based on rough sets and to a family known as rough processors for digital computers. We would also like to congratulate Professor Pawlak, who received an honorary doctorate (Doctor Honoris Causa) from Poznań Polytechnic University, Poznań, Poland on 10 April 2002.

We wish to express our gratitude to Professors Zdzislaw Pawlak and Lotfi A. Zadeh, who accepted our invitation to serve as honorary chairs and to present keynote papers for this conference. We also wish to thank Professors J. Komorowski, T.Y. Lin, D.W. Russell, R. Slowiński, and I.B. Türksen for accepting our invitation to be plenary speakers at RSCTC 2002.

The papers contributed to this volume reflect advances in rough sets as well as complementary research efforts in the following areas:

- Rough set foundations
- Rough sets and fuzzy sets
- Rough neurocomputing
- Rough sets and probabilistic reasoning
- Rough set methods

- Rough set applications in biology, classification, dynamical systems, image processing, medical diagnosis, musicology, neurology, pattern recognition, robotics and robotic control systems, signal analysis, software engineering, and web mining
- Computing with words and granular computing
- Machine learning and pattern recognition
- Data mining

We wish to express our thanks to the members of the Advisory Board: N. Cercone, J. Grzymała-Busse, T.Y. Lin, A. Nakamura, S.K. Pal, L. Polkowski, R. Slowiński, H. Tanaka, S. Tsumoto, Y.Y. Yao, and W. Ziarko for their contribution to the scientific program of this conference. We also wish to thank the local committee for their help in organizing this conference: P. McFadden, C. Neill, K. Patel, F. Ramsey, and S.S. Sligh.

The accepted papers that appear in this volume were selected from over 100 submitted draft papers. These papers were divided into regular communications (each allotted 8 pages) and short communications (each allotted 4 pages) on the basis of reviewer evaluations. Most papers received three or more reviews. The reviewing process itself rested with the RSCTC 2002 Program Chairs, members of the RSCTC 2002 Advisory Board, and the following members of the Program Committee: P. Apostoli, M. Beynon, H.D. Burkhard, G. Cattaneo, J.S. Deogun, P. Doherty, D. Dubois, I. Duentzsch, S. Greco, X. Hu, M. Inuiguchi, J. Järvinen, J. Komorowski, B. Kostek, J. Koronacki, M. Kryszkiewicz, C.-J. Liao, P. Lingras, B. Matarazzo, E. Menasalvas, Z. Michalewicz, R. Michalski, N. Michinori, S. Miyamoto, M. Moshkov, T. Murai, H.S. Nguyen, E. Orłowska, W. Pedrycz, M. Quafafou, S. Ramanna, Z. Raś, J. Stefanowski, J. Stepaniuk, Z. Suraj, A. Szalas, M. Szczuka, A. Wakulicz-Deja, G. Wang.

We also would like to acknowledge help in reviewing from P. Balbiani, J. Bazan, K. Dembczynski, D. Niwiński, G. Góra, Y. Kawahara, R. Latkowski, J. Małuszyński, H. Midelfart, J.M. Peña, A. Radzikowska, D. Ślęzak, P. Synak, S. Wilk, A. Wojna, J. Wróblewski, M. Zawadowski.

Special thanks are also extended to Marcin Szczuka, Jakub Wróblewski, and Dominik Ślęzak for their help in typesetting and preparing the RSCTC 2002 proceedings.

Our special thanks go to all individuals who submitted valuable papers for the RSCTC 2002 conference and to all conference participants.

We also wish to express our thanks to Alfred Hofmann at Springer-Verlag for his support and cooperation.

October 2002

James Alpigini  
James F. Peters  
Andrzej Skowron  
Ning Zhong

## RSCTC 2002 Conference Committee

**Honorary Chairs:** Zdzisław Pawlak, Lotfi A. Zadeh  
**Conference Chair:** James Alpigini  
**Program Chairs:** James F. Peters, Andrzej Skowron, Ning Zhong

### Advisory Board

|                      |                 |                 |
|----------------------|-----------------|-----------------|
| Nick Cercone         | Sankar K. Pal   | Shusaku Tsumoto |
| Jerzy Grzymała-Busse | Lech Polkowski  | Yiyu Yao        |
| Tsau Young Lin       | Roman Słowiński | Wojciech Ziarko |
| Akira Nakamura       | Hideo Tanaka    |                 |

### Local Committee

|                |               |                 |
|----------------|---------------|-----------------|
| Patty McFadden | Kalpesh Patel | Sally Sue Slish |
| Colin Neill    | Fred Ramsey   |                 |

### Program Committee

|                       |                      |                      |
|-----------------------|----------------------|----------------------|
| Peter Apostoli        | Bożena Kostek        | Sheela Ramanna       |
| Ali Arsanjani         | Jacek Koronacki      | Zbigniew W. Raś      |
| Malcolm Beynon        | Marzena Kryszkiewicz | Ron Shapira          |
| Hans Dieter Burkhard  | Churn-Jung Liao      | Jerzy Stefanowski    |
| Mihir Kr. Chakraborty | Pawan Lingras        | Jarosław Stepaniuk   |
| Liu Chunnian          | Jiming Liu           | Zbigniew Suraj       |
| Andrzej Czyżewski     | Qing Liu             | Roman Świniarski     |
| Jitender S. Deogun    | Solomon Marcus       | Andrzej Szalas       |
| Patrick Doherty       | Benedetto Matarazzo  | Marcin Szczuka       |
| Dieder Dubois         | Ernestina Menasalvas | Francis E.H. Tay     |
| Ivo Duentsch          | Zbigniew Michalewicz | Helmut Thiele        |
| Maria C. Fernandez    | Ryszard Michalski    | Mihaela Ulieru       |
| Fernando Gomide       | Nakata Michinori     | Alicja Wakulicz-Deja |
| Salvatore Greco       | Sadaaki Miyamoto     | Guoyin Wang          |
| Xiaohua Hu            | Mikhail Moshkov      | Anita Wasilewska     |
| Masahiro Inuiguchi    | Tetsuya Murai        | Michael Wong         |
| Jouni Järvinen        | Nguyen Hung Son      | Xindong Wu           |
| Janusz Kacprzyk       | Ewa Orłowska         | Hussein Zedan        |
| Daijin Kim            | Witold Pedrycz       |                      |
| Jan Komorowski        | Mohamed Quafafou     |                      |