



**INTERNATIONAL JOINT CONFERENCE  
ON ROUGH SETS 2019**  
17–21 June, University of Debrecen, Hungary



**Monday**

**14:00 Registration**

**Hall**

**18:00 Welcome party**

**Faculty of Informatics Building**



<b>8:30 Registration</b>	<b>Hall</b>
<b>9:00 Opening Ceremony</b>	<b>F01</b>
<b>Invited talk</b> Chair: <b>Mihir Chakraborty</b>	<b>F01</b>
9:30 <i>Fuzzy Rough Sets: Achievements and Opportunities</i> Chris Cornelis	
<b>10:30 Coffee break</b>	<b>F02</b>
<b>Session A1</b> Chair: <b>Zbigniew W. Ras</b>	<b>F01</b>
11:00 <i>Rough Sets and the Algebra of Conditional Logic</i> Gayatri Panicker and Mohua Banerjee	
11:30 <i>Iterative Set Approximations Based on Tolerance Relation</i> Laszlo Aszalos and Dávid Nagy	
12:00 <i>Building a Framework of Rough Inclusion Functions by Means of Computerized Proof Assistant</i> Adam Grabowski	
<b>Session B1</b> Chair: <b>Zbigniew Suraj</b>	<b>102</b>
11:00 <i>A Scalable Approach to Fuzzy Rough Nearest Neighbour Classification with Ordered Weighted Averaging Operators</i> Oliver Urs Lenz, Daniel Peralta and Chris Cornelis	
11:30 <i>Methods to Edit Multi-label Training Sets Using Rough Sets Theory</i> Marilyn Bello, Gonzalo Nápoles, Koen Vanhoof and Rafael Bello	
12:00 <i>Three-Way Classification: Ambiguity and Abstention in Machine Learning</i> Andrea Campagner, Federico Cabitza and Davide Ciucci	
<b>12:30 Lunch</b>	<b>Lovarda</b>
<b>Session A2</b> Chair: <b>Yiyu Yao</b>	<b>F01</b>
14:00 <i>Incremental Sequential Three-Way Decision Using a Deep Stacked Autoencoder</i> Hong Chen, Huaxiong Li, Bing Huang, Xiuyi Jia and Xianzhong Zhou	
14:30 <i>Three-way Decision Collaborative Recommendation Algorithm Based on User Reputation</i> Fulan Qian, Qianqian Min, Shu Zhao, Jie Chen, Xiangyang Wang and Yanping Zhang	
15:00 <i>Multi-Graded Hybrid MRDM Model for Assisting Financial Performance Evaluation Decisions: A Preliminary Work</i> Kao-Yi Shen, Hiroshi Sakai and Gwo-Hshiung Tzeng	
<b>Session B2</b> Chair: <b>Ivo Düntsch</b>	<b>102</b>
14:00 <i>Soft Petri Net</i> Sibasis Bandyopadhyay, Zbigniew Suraj and Prasun Nayak	
14:30 <i>Membrane Systems and Multiset Approximation: The Cases of Inner and Boundary Rule Application</i> Péter Battyányi and György Vaszil	
15:00 <i>Concepts Approximation Through Dialogue With User</i> Soma Dutta and Andrzej Skowron	
<b>15:30 Coffee break</b>	<b>F02</b>



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**Tuesday**

**Session A3** Chair: **Duoqian Miao**

F01

16:00 *Rough Sets Defined by Multiple Relations*

Jouni Jarvinen, Laszlo Kovacs and Sandor Radeleczki

16:30 *Rough Matroids Based on Dual Approximation Operators*

Mauricio Restrepo and Chris Cornelis

17:00 *Rough Sets Based on Possible Indiscernibility Relations in Incomplete Information Tables with Continuous Values*

Michinori Nakata, Hiroshi Sakai and Keitarou Hara

**Session B3** Chair: **Nguyen Hung Son**

102

16:00 *A Multi-Granularity Representation Learning Framework for User Identification Across Social Networks*

Shun Fu, Guoyin Wang, Shuyin Xia and Li Liu

16:30 *A Robust Long-term Pedestrian Tracking-by-Detection Algorithm Based on Three-way Decision*

Ziye Wang, Duoqian Miao, Cairong Zhao, Sheng Luo and Zhihua Wei

17:00 *Developing Pricing Models for Online Art Sales Using Text Analytics*

Laurel Powell, Anna Gelich and Zbigniew Ras

**18:30 Dinner**

**Lovarda**



# Wednesday

<b>8:30 Registration</b>	<b>Hall</b>
<b>Invited talk</b> Chair: <b>Chris Cornelis</b>	<b>F01</b>
9:00 <i>Pattern structures and pattern setups for mining complex data</i> Sergei Kuznetsov	
<b>10:00 Coffee break</b>	<b>F02</b>
<b>Session A1</b> Chair: <b>JingTao Yao</b>	<b>F01</b>
10:30 <i>Approximation Based on Representatives</i> Dávid Nagy and Laszlo Aszalos	
11:00 <i>Local search for attribute reduction</i> Xiaojun Xie, Ryszard Janicki, Xiaolin Qin, Wei Zhao and Guangmei Huang	
11:30 <i>Studies on Reducing the Necessary Data Size for Rule Induction from the Decision Table by STRIM</i> Yuichi Kato and Tetsuro Saeki	
12:00 <i>Concept Approximation Based on Rough Sets and Judgment</i> Jaroslaw Stepaniuk, Grzegorz Gora and Andrzej Skowron	
<b>Session B1</b> Chair: <b>Adam Grabowski</b>	<b>102</b>
10:30 <i>Constructing the Optimal Approximation Sets of Rough Sets in Multi-granularity Spaces</i> Qinghua Zhang, Fan Zhao, Yubin Xue and Jie Yang	
11:00 <i>A Dynamic Dominance-based Rough Set Approach for Processing Ordered Data</i> Shaoyong Li and Zhiyong Hong	
11:30 <i>CSLI: Cost-sensitive collaborative filtering with local information embedding</i> Heng-Ru Zhang, Jie Qian and Fan Min	
12:00 <i>Attribute reduction based on optimistic multi-granulation information systems</i> Binli Ou and Tian Yang	
<b>12:30 Lunch</b>	<b>Lovarda</b>
<b>Invited talk</b> Chair: <b>Andrzej Skowron</b>	<b>F01</b>
14:00 <i>Probabilistic Rough Sets</i> Wojciech Ziarko	
<b>15:00 Social Program</b>	
<b>19:00 Banquet</b>	<b>UD</b>



# Thursday

<b>Invited talk</b> Chair: <b>Davide Ciucci</b>	F01
9:00 <i>Learning from imprecise, incomplete, and coarse data</i> Eyke Hüllermeier	
<b>10:00 Coffee break</b>	F02
<b>Session A1</b> Chair: <b>Dominik Slezak</b>	F01
10:30 <i>An Application of Bayesian Confirmation Theory for Three-Way Decision</i> Mengjun Hu, Xiaofei Deng and Yiyu Yao	
11:00 <i>On the Roughly Continuous Real Functions</i> Zoltán Ernő Csajbók	
11:30 <i>Learning Multi-granular Features for Harvesting Knowledge from Free Text</i> Zheng Zhou, Huaming Wang, Zhixing Li, Feng Hu and Guoyin Wang	
12:00 <i>A Three-Way Clustering Algorithm via Decomposing Similarity Matrices for Multi-View Data with Noise</i> Jing Xiong and Hong Yu	
<b>Session B1</b> Chair: <b>Wojciech Ziarko</b>	102
10:30 <i>On topologies defined by binary relations in rough sets</i> Michiro Kondo	
11:00 <i>The Prototype View of Concepts</i> Ruisi Ren and Ling Wei	
11:30 <i>A Bibliometric Profile of Research on Rough Sets</i> Wenjie Wei, Duoqian Miao and Yuxiang Li	
12:00 <i>Rough Sets and Local Texture Features for Diagnosis of Connective Tissue Disorders</i> Debamita Kumar and Pradipta Maji	
<b>12:30 Lunch</b>	Lovarda
<b>Session A2</b> Chair: <b>Zoltán Ernő Csajbók</b>	F01
14:00 <i>Multivariate Ovulation Window Detection at OvuFriend</i> Joanna Fedorowicz, Lukasz Sosnowski, Dominik Slezak, Iwona Szymusik, Wojciech Chaber, Lukasz Milobedzki, Tomasz Penza, Jadwiga Sosnowska, Katarzyna Wojcicka and Karol Zaleski	
14:30 <i>3D Face Recognition Based on Hybrid Data</i> Xinxin Li and Xun Gong	
15:00 <i>The Impact of Rough Set Conferences</i> Jingtao Yao	
<b>15:30 Coffee break</b>	F02
<b>Round table</b> Chair: <b>Guoyin Wang</b>	F01
16:00 <i>The future of rough sets</i>	
<b>17:00 IRSS annual meeting</b>	F01
<b>18:30 Dinner</b>	Lovarda



## Friday

<b>Invited talk</b>	Chair: <b>Guoyin Wang</b>	F01
9:00	<i>Interplay between Rough Sets and Modal Logics; Soft Truth, Soft Consequence and Soft Computing</i> Mihir Chakraborty	
<b>10:00</b>	<b>Coffee break</b>	<b>F02</b>
<b>Session A1</b>	Chair: <b>György Vaszil</b>	F01
10:30	<i>Approximations induced by tolerance relations</i> Dávid Gégény, Imre Piller, Sándor Radeleczki and Laura Veres	
<b>Session B1</b>	Chair: <b>Jaroslav Stepaniuk</b>	102
10:30	<i>Discovering Flow Graphs from Data Tables Using the Classification and Prediction Software System (CLAPSS)</i> Krzysztof Pancierz, Arkadiusz Lewicki and Jaromir Sarzynski	
11:00	<i>Hardware Implementation on Field Programmable Gate Array of Two-Stage Algorithm for Rough Set Reduct Generation</i> Tomasz Grzes and Maciej Kopczynski	
<b>11:30</b>	<b>Closing Ceremony</b>	<b>F01</b>
<b>12:00</b>	<b>Lunch</b>	<b>Lovarda</b>
<b>13:30</b>	<b>Excursion</b>	