

**INTERNATIONAL JOINT CONFERENCE
ON ROUGH SETS
20-24 AUGUST 2018, QUY NHON, VIETNAM**



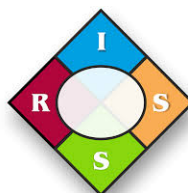
CONFERENCE PROGRAM



**UNIVERSITY OF
SCIENCE**
VIETNAM NATIONAL UNIVERSITY HO CHI MINH CITY



Springer



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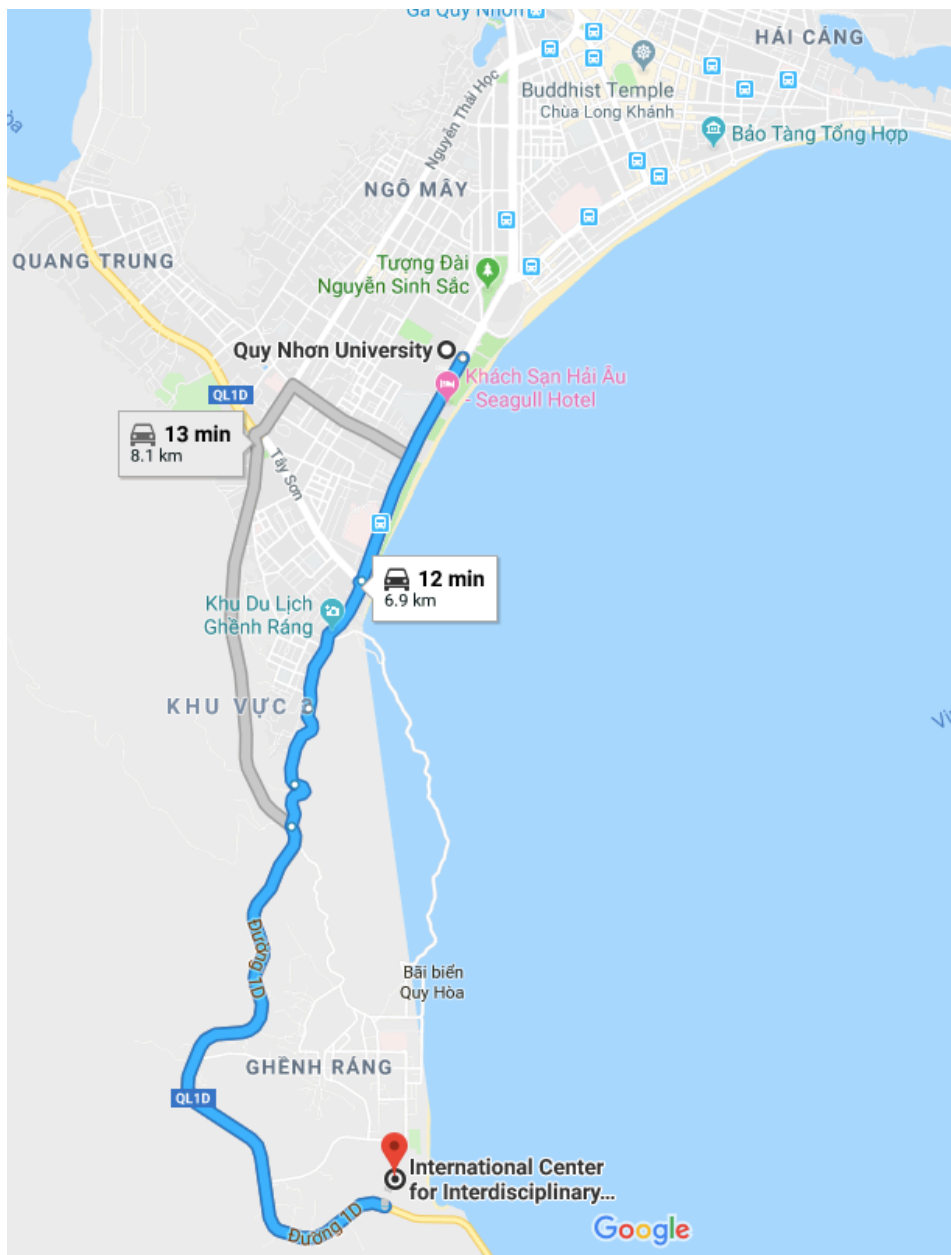
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VENUE

IJCRS2018 will have place in Quy Nhon city, a small city located on the east coast of Vietnam, 649 km north from **Ho Chi Minh City** and 1065 km south from **Hanoi**. It is composed of 16 wards and five communes with a total of 284 km². Quy Nhon is the capital of Binh Dinh Province. As of 2009 its population was 280,535. Historically, the commercial activities of the city focused on agriculture and fishing. In recent years, however, there has been a significant shift towards service industries and tourism. There is also a substantial manufacturing sector.

The conference will be organized in the International Center for Interdisciplinary Science and Education (ICISE) and the Quy Nhon University (QNU).

The ICISE conference center

The ICISE conference center is part of the International Centre for Interdisciplinary Science and Education. It is a brand new facility established in 2013 in Quy Nhon (Binh Dinh province) and it is located 6 kilometers from the city centre of Quy Nhon. The ICISE conference center has been founded in 2013, together with the International Centre for Interdisciplinary Science and Education, and is commissioned by the association 'Rencontres du Vietnam' under the direction of its founders Prof. Jean Tran Thanh Van and Prof. Le Kim Ngoc. The conference center is surrounded by a beautiful parkland that faces a river and mountains, just at 200 metres far from its private sandy beach.

Website: <http://www.vietnamconferencecenter.com/>

Address: Ghenh Rang, Quy Nhon city, Binh Dinh province, Vietnam

The Quy Nhon Univeristy

Founded in 1977, Quy Nhon University is a non-profit public higher education institution located in the Quy Nhon city. Officially accredited and/or recognized by the Ministry of Education and Training, Vietnam, Quy Nhon University (QNU) is a large (uniRank enrollment range: 10,000-14,999 students) coeducational higher education institution. Quy Nhon University (QNU) offers courses and programs leading to officially recognized higher education degrees such as bachelor degrees, master degrees and PhD degree in many areas of study.

Website: <http://www.qnu.edu.vn>

Address: 170 An Dương Vương, Quy Nhon

SPEAKERS

We are honored to announce the following exciting line up of esteemed speakers: Prof. Ho Tu Bao (keynote), Prof. Hamido Fujita (keynote), Prof. Andrzej Skowron (keynote), Prof. Hong Yu (keynote), Prof. Piero Pagliani (invited), Prof. Mohua (invited fellow), Prof. Dominik Ślęzak (tutorial) and Dr Arkadiusz Wojna (tutorial).

Hamido Fujita

- Professor at Iwate Prefectural University, Japan, Director of Intelligent Software Systems.
- Editor-in-Chief: Knowledge-based system, Elsevier
- Co-Editor-in-Chief: Applied Intelligence, Springer



Keynote: Challenges for Machine Learning Techniques on Data Analytics for Uncertainty based Risk Predictions

Biography: Hamido Fujita is a professor at Iwate Prefectural University (IPU), Iwate, Japan, serving as a director of Intelligent Software Systems. He is the Editor-in-Chief of Knowledge-Based Systems, Elsevier. He received Doctor Honoris Causa from O'buda University in 2013, and a title of Honorary Professor from O'buda University, Budapest, Hungary in 2011. He received honorary scholar award from University of Technology Sydney, Australia on 2012. He is Adjunct professor to Stockholm University, Sweden, University of Technology Sydney, National Taiwan Ocean University and others. He has supervised PhD students jointly with University of Laval, Quebec, Canada; University of Technology, Sydney, Australia; Oregon State University (Corvallis), University of Paris 1 Pantheon-Sorbonne, France and University of Genoa, Italy. He has four international Patents in Software System and Several research projects with Japanese industry and partners. He is vice president of International Society of Applied Intelligence, and Co-Editor in Chief of Applied Intelligence Journal, (Springer). He has given many keynotes in many prestigious international conferences on intelligent system and subjective intelligence. He headed a number of projects including Intelligent HCI, a project related to Mental Cloning as an intelligent user interface between human user and computers and SCOPE project on Virtual Doctor Systems for medical applications.



Tu-Bao Ho (Hồ Tú Bảo)

- Professor Emeritus, Japan Advanced Institute of Science and Technology, bao@jaist.ac.jp
- Data Science Lab, Vietnam Institute for Advanced Study in Mathematics, bao@viasm.edu.vn
- John von Neumann Institute, Vietnam National University, bao.ho@jvn.edu.vn

Keynote: Exploiting Electronic Medical Records for Healthcare and Medical Research

Biography: B.Tech. from Hanoi University of Technology in Applied Mathematics (1979), Master (1984) and PhD (1987) from University Paris 6, and habilitation (1998) from University Paris 9, both on Machine Learning and Artificial Intelligence. Associate Professor (1991) at the Vietnam Academy of Science and Technology (VAST), and Professor (1998) at Japan Advanced Institute of Science and Technology (JAIST). Research interests include Machine Learning, Data Mining, and Data Science. Members of Steering Committees of Pacific Rim International Conference on Artificial Intelligence (PRICAI), Asia Conference on Machine Learning (ACML) and Pacific-Asia Conferences on Knowledge Discovery and Data Mining (PAKDD).

Andrzej Skowron

- Professor, University of Warsaw
- ECCAI and IRSS Fellow
- ICI Thomson Reuters/ Clarivate Analytics mostly cited researchers in Computer Science (globally) in 2012, 2016, 2017



Keynote: Rough Sets: Past, Present, and Future

Biography: Andrzej Skowron, ECCAI and IRSS Fellow, received the Ph. D. and D. Sci. (habilitation) from the University of Warsaw in Poland. In 1991 he received the Scientific Title of Professor. He is Full Professor in the Faculty of Mathematics,

Informatics and Mechanics at the University of Warsaw. Andrzej Skowron is the (co)author of more than 400 scientific publications and editor of many books. His areas of expertise include reasoning with incomplete information, approximate reasoning, soft computing methods and applications, rough sets, rough mereology, granular computing, intelligent systems, knowledge discovery and data mining, decision support systems, adaptive and autonomous systems, perception based computing, and interactive computational systems. He was the supervisor of more than 20 PhD Theses. In the period 1995-2009 he was the Editor-in-Chief of *Fundamenta Informaticae* journal. He is on Editorial Boards of many others international journals. Andrzej Skowron was the President of the International Rough Set Society from 1996 to 2000. He has delivered numerous invited talks at international conferences. He was serving as (co-)program chair and PC member of more than 200 international conferences. He was involved in numerous research and commercial projects including dialog-based search engine (Nutech), fraud detection for Bank of America (Nutech), logistic project for General Motors (Nutech), algorithmic trading (Adgam), control of UAV (Linköping University), and medical decision support (Polish-American Pediatric Clinic in Cracow).

Hong Yu

- Professor at Chongqing University of Posts and Telecommunications in China
- Dean of the Department of Intelligence Science and Technology



Keynote: Three-way Decisions and Three-way Clustering

Biography: Hong Yu is a professor at Chongqing University of Posts and Telecommunications in China, where she serves as the Dean of the Department of Intelligence Science and Technology. She is interested in rough sets, three-way decisions, cluster analysis, Web intelligence, automation of knowledge, data mining and intelligent information processing. Her researches have been funded by the National Natural Science Foundation of China. She received a Chongqing Natural Science and Technology Award. She has published several books and some peer-reviewed research articles. Her paper was selected as one of Top Articles in Outstanding S&T Journal of China.



INTERNATIONAL JOINT CONFERENCE ON ROUGH SETS 2018

PROGRAM OVERVIEW

Saturday, August 18

TDT University, HoChiMinh City

9:00-17:00 Pre-conference Workshops on Rough Sets and Data Science
<http://workshopijcrs2018.tdtu.edu.vn/>

Monday, August 20

Quy Nhon University

9:00 – 11:00 Interactive Mass lecture to the Faculty of Mathematics and Computer Science
13:00 – 16:00 Tutorial: Rough Sets in Data Mining and Databases: Foundations and Applications – Dominik Ślęzak, Arkadiusz Wojna
13:00 – 16:00 Registration

Tuesday, August 21

International Center for Interdisciplinary Science – ICISE

8:00 Registration
8:30 – 9:00 Opening
9:00 – 10:00 Keynote: *Exploiting Electronic Medical Records for Healthcare and Medical Research* – Tu-Bao Ho
10:00 – 10:30 *Coffee break*
10:30 – 12:30 Parallel Session
RS1: Core Rough set models
SS1: Rough sets and data mining I
12:30 – 14:00 *Lunch*
14:00 – 15:00 Keynote: *Challenges Machine Learning Techniques on Data Analytics for Uncertainty based Risk Predictions* – Hamido Fujita
15:00 – 15:30 *Coffee break*
15:30 – 17:30 Parallel Session
SS2: Rough Logics and Foundation of rough sets I
RS2: Rough set methods
18:30 *Welcome party at Quy Nhon University*

Wednesday, August 22

International Center for Interdisciplinary Science – ICISE

9:00 – 10:00	Retrospective talk: <i>Rough Sets: Past, Present, and Future</i> – Andrzej Skowron
10:00 – 10:30	<i>Coffee break</i>
10:30 – 12:30	Parallel Session SS2: Rough Logics and Foundation of rough sets II RS3: Rough sets and Machine Learning
12:30 – 14:00	<i>Lunch</i>
14:00 – 15:00	Keynote: <i>Three-way Decisions and Three-way Clustering</i> – Hong Yu
15:00 – 15:30	<i>Coffee break</i>
15:30 – 17:30	Parallel Session SS1: Rough sets and data mining II W: Three-way decisions, Uncertainty, Granular Computing I
19:00	<i>Banquet</i>

Thursday, August 23

International Center for Interdisciplinary Science – ICISE

9:00 – 10:30	Parallel Session RS4: Hybrid Methods RS5: Concept Approximation
10:30 – 11:00	<i>Coffee break</i>
11:00 – 12:30	Parallel Session RS6: Granular Computing W: Three-way decisions, Uncertainty, Granular Computing II
12:30 – 14:00	<i>Lunch</i>
14:00 – 14:45	Invited Talk: <i>What's in a relation? Logical structures of modes of granulation</i> – Piero Pagliani
14:45 – 15:30	Fellow Talk: Mohua Banerjee
15:30 – 16:00	<i>Coffee break</i>
16:00 – 17:00	Business meeting

Friday, August 24

Quy Nhon University

9:00-11:00	Discussion Panel
11:00-11:15	Closing address



INTERNATIONAL JOINT CONFERENCE
ON ROUGH SETS 2018

DETAIL PROGRAM

Monday, 20 August,

Quy Nhon University

Interactive Mass lecture

Monday, 9:00 – 11:00

- Interactive Mass lecture to the Faculty of Mathematics and Computer Science
Tu Bao Ho, Hung Son Nguyen

Tutorial and registration

Monday, 13:00 – 16:00

- Tutorial: Rough Sets in Data Mining and Databases: Foundations and Applications
Dominik Ślęzak, Arkadiusz Wojna
- Registration

Tuesday, 21 August,

ICISE

Morning Session

Tuesday, 8:30-10:00

Room: Conference Hall

Chair: Davide Ciucci and Hung Son Nguyen

- Opening
- Welcome speech by the Rector of the Quy Nhon University
Ngoc-My Do
- Keynote: Exploiting Electronic Medical Records for Healthcare and Medical Research
Tu-Bao Ho

10:00 – 10:30

Coffee break

RS1 – Core Rough Set Models

Tuesday, 10:30 – 12:30

Room: Conference Hall

Chair: Andrzej Skowron

- Similarity Based Rough Sets with Annotation
Dávid Nagy, Tamás Mihálydeák and Laszlo Aszalos
- A Metaphor for Rough Set Theory: Modular Arithmetic
Marcin Wolski and Anna Gomolinska
- Attribute Reduction Algorithms for Relation Systems on Two Universal Sets
Hua Zheng, Li Qianchen and Liu Guilong
- Boundary Region Reduction for Relation Systems
Guilong Liu and Jie Liu

SS1 – Rough sets and data mining I

Tuesday, 10:30 – 12:30

Room: Seminar Room

Chair: Bay Vo

- Exploring GTRS Based Recommender Systems with Users of Different Rating Patterns
Bingyu Li and Jingtao Yao
- Introducing Dynamic Structures of Rough Sets. The Case of Text Processing: Anaphoric Co-Reference in Texts in Natural Language
Wojciech Budzisz and Lech Polkowski
- Medical Diagnosis from Images with Intuitionistic Fuzzy Distance Measures
Thi Ngan Roan, Cong Cuong Bui, Manh Tuan Tran and Hoang Son Le
- A New Trace Clustering Algorithm Based on Context in Process Mining
Hong-Nhung Bui, Tri-Thanh Nguyen, Thi-Cham Nguyen and Quang-Thuy Ha

12:30 – 14:00

Lunch

Afternoon Session

Tuesday, 14:00 – 15:00

Room: Conference Hall

Chair: Duoqian Miao

- Keynote: Challenges Machine Learning Techniques on Data Analytics for Uncertainty based Risk Predictions
Hamido Fujita

15:00 – 15:30

Coffee break

SS2 – Rough Logics and Fundation of rough sets I

Tuesday, 15:30 – 17:30

Room: Conference Hall

Chair: Piero Pagliani

- Bipolar Queries with Dialogue: Rough Set Semantics
Soma Dutta and Andrzej Skowron
- Logic on Similarity Based Rough Sets
Tamás Mihálydeák
- Sequent Calculi for Varieties of Topological Quasi-Boolean Algebras
Minghui Ma, Mihir Chakraborty and Zhe Lin
- Fuzzy Bisimulations in Fuzzy Description Logics under the Gödel Semantics
Quang-Thuy Ha, Linh Anh Nguyen, Thi Hong Khanh Nguyen and Thanh-Luong Tran

RS2 – Rough Set Methods

Tuesday, 15:30 – 17:30

Room: Seminar Room

Chair: Arkadiusz Wojna

- A Test Cost Sensitive Heuristic Attribute Reduction Algorithm for Partially Labeled Data
Shengdan Hu, Duoqian Miao, Zhifei Zhang, Sheng Luo, Yuanjian Zhang and Guirong Hu
- NDER Attribute Reduction via an Ensemble Approach
Huixiang Wen, Eric Appiah Mantey, Xiangjian Chen, Keyu Liu and Pingxin Wang
- Reduct Calculation and Discretization of Numeric Attributes in Entity Attribute Value Model
Wojciech Swieboda and Sinh Hoa Nguyen
- Fuzzy Partition Distance based Attribute Reduction in Decision Tables
Van Thiên Nguyen, Long Giang Nguyen and Nhu Son Nguyen

18:00 – 19:00

Welcome party invited by the Quy Nhon University

Wednesday, 22 August,

ICISE

Morning Session

Wednesday, 9:00-10:00

Room: Conference Hall

Chair: Dominik Ślęzak

- Retrospective talk: Rough Sets: Past, Present, and Future
Andrzej Skowron

10:00 – 10:30 *Coffee break*

SS2 – Rough Logics and Fundation of rough sets II

Wednesday, 10:30 – 12:30

Room: Conference Hall

Chair: Tamás Mihálydeák

- Decidability in Pre-rough Algebras: Extended Abstract
Zhe Lin, Mihir Chakraborty and Minghui Ma
- Transformation Semigroups for Rough Sets
Anuj Kumar More and Mohua Banerjee
- Dynamic and Discernibility Characteristics of Different Attribute Reduction Criteria
Dominik Ślęzak and Soma Dutta
- Some Foundational Aspects of Rough Sets Rendering Its Wide Applicability
Andrzej Skowron and Soma Dutta

RS3 – Rough Sets and Machine Learning

Wednesday, 10:30 – 12:30

Room: Seminar room

Chair: Sinh Hoa Nguyen

- Rseslib 3: Open Source Library of Rough Set and Machine Learning Methods
Arkadiusz Wojna and Rafał Latkowski
- Studies on CART's Performance in Rule Induction and Comparisons by STRIM
Yuichi Kato, Shoya Kawaguchi and Tetsuro Saeki
- Considerations on Rule Induction Methods by the Conventional Rough Set Theory from a View of STRIM
Tetsuro Saeki, Jiwei Fei and Yuichi Kato
- Rule Induction Based on Indiscernible Classes from Rough Sets in Information Tables with Continuous Values
Michinori Nakata, Hiroshi Sakai and Keitarou Hara

12:30 – 14:00 *Lunch*

Afternoon Session

Wednesday, 14:00-15:00

Room: Conference Hall

Chair: Mohua Banerjee

- Keynote: Three-way Decisions and Three-way Clustering
Hong Yu

15:00 – 15:30 *Coffee break*

SS1 – Rough sets and data mining II

Wednesday, 15:30-17:30

Room: Conference Hall

Chair: Quang Thuy Ha

- Tolerance Methods in Graph Clustering: Application to Community Detection in Social Networks
Vahid Kardan and Sheela Ramanna
- External Indices for Rough Clustering
Matteo Re Depaolini, Davide Ciucci, Silvia Calejari and Matteo Dominoni
- An Efficient Method for Mining Clickstream Patterns
Bang Bui, Bay Vo, Huy Huynh, Tu-Anh Nguyen-Hoang and Bao Huynh
- Multidimensional Data Analysis for Evaluating the Natural and Anthropogenic Safety (in the Case of Krasnoyarsk Territory)
Tatiana Penkova

W – Three-way decisions, Uncertainty, Granular Computing I

Wednesday, 15:30-17:30

Room: Seminar room

Chair: Hong Yu

- A method for Boundary Processing in Three-way Decisions Based on Hierarchical Feature Representation
Jie Chen, Yang Xu, Shu Zhao, Yuanting Yan, Yanping Zhang, Weiwei Li, Qianqian Wang and Xiangyang Wang
- Covering-based Optimistic-pessimistic Multigranulation Decision-theoretic Rough Sets
Caihui Liu, Jin Qian, Nan Zhang and Meizhi Wang
- A Conflict Analysis Model Based on Three-Way Decisions
Yan Fan, Jianjun Qi and Ling Wei
- An Optimization View on Intuitionistic Fuzzy Three-Way Decisions
Jiubing Liu, Xian-Zhong Zhou, Huaxiong Li, Bing Huang, Libo Zhang and Xiuyi Jia

19:00 –

Conference Dinner

Thursday, 23 August,

ICISE

RS4 – Hybrid Methods

Thursday, 9:00 – 10:30

Room: Conference Hall

Chair: Marcin Szczuka

- Toward Optimization of Reasoning Using Generalized Fuzzy Petri Nets
Zbigniew Suraj

- Rough Set Approach to Sufficient Statistics
Bao Tuyen Huynh, Thi Thu Phuong Ta and Phuoc Huy Dang
- Algebras from Semiconcepts in Rough Set Theory
Prosenjit Howlader and Mohua Banerjee
- Contextual Probability Estimation from Data Samples, a Generalisation
Hui Wang and Bowen Wang

RS5 – Concept Approximation

Thursday, 9:00 – 10:30

Room: Seminar room

Chair: Marcin Wolski

- Approximation by Filter Functions
Ivo Düntsch, Günther Gediga and Hui Wang
- Tolerance Relations and Rough Approximations in Incomplete Contexts
Tong-Jun Li, Wei-Zhi Wu and Xiao-Ping Yang
- A Formal Study of a Generalized Rough Set Model Based on Relative Approximations
Md. Aquil Khan and Vineeta Singh Patel
- Application of the Pairwise Comparison Matrices into a Dispersed Decision-Making System with Pawlak's Conflict Model
Małgorzata Przybyła-Kasperek

10:30 – 11:00

Coffee break

S6 – Granular Computing

Thursday, 11:00 – 12:30

Room: Conference Hall

Chair: Dun Liu

- Multi-granularity Attribute Reduction
Shaochen Liang, Keyu Liu, Xiangjian Chen, Pingxin Wang and Xibei Yang
- Multi-label Online Streaming Feature Selection Based on Spectral Granulation and Mutual Information
Huaming Wang, Dongming Yu, Yuan Li, Zhixing Li and Guoyin Wang
- On Granular Rough Computing: epsilon homogenous granulation
Piotr Artiemjew and Krzysztof Ropiak
- Application of Greedy Heuristics for Feature Characterisation and Selection: A Case Study in Stylometric Domain
Urszula Stańczyk, Beata Zielosko and Krzysztof Zabiński

W – Three-way decisions, Uncertainty, Granular Computing II

Thursday, 11:00 – 12:30

Room: Seminar room

Chair: Ling Wei

- A Method to Determine the Number of Clusters Based on Multi-validity Index
Ning Sun and Hong Yu
- A Sequential Three-Way Approach to Constructing a Co-Association Matrix in Consensus Clustering
Mengjun Hu, Xiaofei Deng and Yiyu Yao
- Composite Sequential Three-way Decisions
Xin Yang, Ning Wang, Tianrui Li, Dun Liu and Chuan Luo

12:30 – 14:00

Lunch

Afternoon Session

Thursday, 14:00-15:30

Room: Conference Hall

Chair: Mihir Chakraborty and Davide Ciucci

- Invited Talk: What's in a relation? Logical structures of modes of granulation
Piero Pagliani
- Fellow Talk: Rough sets and Algebras: a continuing exploration
Mohua Banerjee

15:30 – 16:00

Coffee break

Industry Talk and Business meeting

Thursday, 16:00-17:30

Room: Conference Hall

Chair: Davide Ciucci

- Industry Talk: Introducing Histogram Functions into a Granular Approximate Database Engine
Dominik Ślęzak, Arkadiusz Wojna
- Business meeting

Friday, 24 August,

Quy Nhon University

Discussion Panel

Friday, 9:00 – 11:15

Chair: Hung Son Nguyen

- Discussion panel
- Closing address