

## **MONDAY AUGUST 17, 2015**

### **9:00-12:00 PLENARY**

- 9:00-9:30 am Opening Remarks, Plato Room
- 9:30-10:30 am, Chair: Shahnaz Shahbazova  
Recorded talk of Lotfi A. Zadeh, Plato Room

10:30-11:00 am coffee break, Bits and Bytes Cafe

- 11:00-12:00 am, Chair: Marek Reformat  
Plenary Talk by Ronald Yager, Plato Room (Iona College, New Rochelle, New York),  
Aggregation Methods for Information Fusion and Decision Making

12:00- 1:00 pm lunch, Bits and Bytes Cafe

### **1:00-2:00 PLENARY**

- 1:00- 2:00 pm Panel, Plato Room, 50 Years Later: Challenges to Worldwide Acceptance of Fuzzy Sets and Systems Organizer and Moderator: Jerry M. Mendel Panelists: Vladik Kreinovich, Terry Rickard, William Melek, Marek Reformat, and Boris Kovalerchuk

### **2:00-3:00 PARALLEL SESSIONS**

Special Session: Fuzzy Logic Applications in Construction Engineering and Management, Part 1, Plato Room

Chair: Aminah Robinson Fayek

- 2:00- 2:20pm Functional Units based Fuzzy Model Framework for Construction Organizations Performance  
Ahmed Radwan, Zenith Rathore, Emad Elwakil
- 2:20- 2:40pm Fuzzy-Based Model For Predicting Lighting Efficiency In Institutional Buildings  
Dalia Salem, Emad Elwakil, Amr Kandil
- 2:40- 3:00pm Framework to Identify and Evaluate the Cause of Conflicts within a Matrix Organization in Construction Industry using Fuzzy Expert System  
Zenith Rathore, Ahmed Radwan, Emad Elwakil

Session: Analysis of Texts, Michelangelo Room  
Chairs: Victor Raskin and Shahnaz Shhabzova

- 2:00- 2:20 pm Analysis of Twitter Hashtags: Fuzzy Clustering Approach  
L. A. Zadeh, A. M. Abbasov, S. N. Shahbazova
- 2:20- 2:40 pm Fuzzy Lexical Acquisition of Adjectives  
Louis Hickman, Julia Taylor, Victor Raskin
- 2:40- 3:00 pm A novel approach to sequence-of-documents focused text categorization using the concept of a degree of fuzzy set subthood  
Slawomir Zadrozny, Janusz Kacprzyk, Marek Gajewski

Special Session: Fuzzy Mathematical Analysis and Applications, Part 1, Van Gogh Room  
Chairs: Luciano Stefanini and Yurilev Chalco-Cano

- 2:00- 2:20 pm A new approach for differentiability of interval-valued functions as first step toward fuzzy differentiability  
Tiago M. da Costa, Weldon A. Lodwick, Y. Chalco-Cano, G. N. Silva
- 2:20- 2:40 pm A note on algebra of generalized Hukuhara differentiable fuzzy-valued functions  
Y. Chalco-Cano
- 2:40- 3:00 pm A note on dynamics of interval extensions of interval functions  
H. Roman-Flores, Y. Chalco-Cano

Biomedical Applications of Fuzzy Techniques, Al-Khwarizmi Room  
Chairs: Faeze Roshani and Mohammad Hossein Fazel Zarandi

- 2:00-2:20 pm Fuzzy Expert System for Prognosis of Breast Cancer Recurrence  
Faeze Roshani, Mohammad Hossein Fazel Zarandi, Ismail Burhan Turksen, Maede Maftouni
- 2:20-2:40 pm FLATM: A Fuzzy Logic Approach Topic Model for Medical Documents  
Amir Karami, Aryya Gangopadhyay, Bin Zhou, Hadi Karrazi
- 2:40-3:00 pm Type-2 Fuzzy Rule-based Expert System for Ankylosing spondylitis Diagnosis  
Maede Maftouni, Mohammad Hossein Fazel Zarandi, Ismail Burhan Turksen, Faezeh Roshani

3:00- 3:20 pm coffee break, Bits and Bytes Cafe

### **3:20-4:20 PLENARY**

- 3:20- 4:20 pm, Chair: Luciano Stefanini, Plenary Talk by Marek Reformat, Plato Room (University of Edmonton, Alberta, Canada) Fuzzy-based Methods for Processing Hybrid and Temporal Data in Linked Open Data Environment

### **4:20-5:20 PARALLEL SESSIONS**

Special Session: Fuzzy Logic Applications in Construction Engineering and Management, Part 2, Plato Room,

Chair: Aminah Robinson Fayek

- 4:20- 4:40 pm Fuzzy Cognitive Maps as a Tool for Modeling Construction Labor Productivity  
Seungjun Ahn, A. J. Antony Chettupuzha, Ronald Ekyalimpa, Stephen Hague, Simaan M. AbouRizk, Chrysostomos D. Stylios
- 4:40- 5:00 pm Integrating Fuzzy Logic and Agent-Based Modeling for Assessing Construction Crew Behavior  
Mohammad Raoufi, Aminah Robinson Fayek
- 5:00- 5:20 pm Fuzzy Contingency Determinator: A Fuzzy Arithmetic-Based Risk Analysis Tool For Construction Projects  
Mohamed M.G. Elbarkouky, Nasir Bedewi Siraj, Aminah Robinson Fayek

Fuzzy Optimization and Its Applications, Michelangelo Room

Chairs: Oscar Castillo and Mohammad Hossein Fazel Zarandi

- 4:20- 4:40 pm Fuzzy control of Parameters to Dynamically Adapt the HS algorithm for optimization  
Cinthia Peraza, Fevrier Valdez, Oscar Castillo
- 4:40- 5:00 pm Optimization of Reactive Controller for Mobile Robots Based on CRA  
David de La O, Oscar Castillo, Abraham Melendez, Leslie Astudillo
- 5:00- 5:20 pm Fuzzy Approximate Reasoning toward Multi-Objective Optimization Policy: Deployment for Supply Chain Programming  
Mohammad Hossein Fazel Zarandi, Mosahar Tarimoradi, Mohammad Hossein Alavidoost, Behnoush Shakeri

Special Session: Fuzzy Mathematical Analysis and Applications, Part 2, Van Gogh Room  
Chairs: Luciano Stefanini and Yurilev Chalco-Cano

- 4:20- 4:40 pm A new interpretation of fuzzy differential equations: Linguistic concepts evolving over time  
Luciana T. Gomes, Michael M. Diniz, Tiago A. Coimbra
- 4:40- 5:00 pm A centroid-based approach for solving linear programming problems with interval type-2 fuzzy technological coefficients  
Juan Carlos Figueroa-Garcia, German Hernandez-Perez
- 5:00- 5:20 pm A generalization of Ostrowski-type inequalities for fuzzy-valued functions  
A. Flores-Franulic, I. Aguirre-Cipe, Y. Chalco-Cano, H. Roman-Flores

Special Session: Complex Fuzzy Sets and Complex Fuzzy Logic, Al-Khwarizmi Room  
Chairs: Scott Dick and Sarah Greenfield

- 4:20- 4:40pm Multi-Variate Timeseries Forecasting Using Complex Fuzzy Logic  
Omolbanin Yazdanbakhsh, Scott Dick
- 4:40- 5:00pm Real and Imaginary Truth in Complex Fuzzy Implication  
Thomas Whalen
- 5:00- 5:20pm From 1-D to 2-D Fuzzy: A Proof that Interval-Valued and Complex-Valued Are the Only Distributive Options  
Christian Servin, Vladik Kreinovich, Olga Kosheleva

## **TUESDAY AUGUST 18, 2015**

### **9:00-10:00 PLENARY**

- 9:00- 10:00 am, Chair: Barnabas Bede, Plenary Talk by Luciano Stefanini, Plato Room (University of Urbino, Urbino, Italy) Recent results in fuzzy arithmetic and fuzzy calculus: theory and applications

10:00-10:30 am coffee break, Bits and Bytes Cafe

## **10:30-11:30 PLENARY**

- 10:30-11:30 am Panel, Plato Room, How to handle a double-edged sword of context in soft computing?  
Organizer and Moderator: Boris Kovalerchuk, Panelists: Yuri Gurevich, Barnabas Bede, Vladik Kreinovich, Daniel Schwartz, Chin-Liang Chang, Thomas Whalen, Ildar Z. Batyrshin

## **11:30-12:30 pm NAFIPS meeting; everyone is welcome, Plato Room**

12:30- 1:30 pm lunch, Bits and Bytes Cafe

## **1:30-2:30 PLENARY**

- 1:30- 2:30 pm, Chair: Vladik Kreinovich, Plenary Talk by Yuri Gurevich, Plato Room (Microsoft Research, Redmond, Washington, USA) Impugning Alleged Randomness

## **2:30-3:30 PARALLEL SESSIONS**

Special Session: Similarity and Association Measures, Part 1, Plato Room  
Chairs: Ildar Batyrshin and Vladik Kreinovich

- 2:30- 2:50 pm Every interval-valued metric can be naturally interpreted in fuzzy terms  
Ildar Z. Batyrshin, Olga Kosheleva
- 2:50- 3:10 pm Similarity in aligning linked open data ontologies  
V. Cross, Chen Gu
- 3:10- 3:30 pm Computing text similarity using tree edit distance  
G. Sidorov, H. Gomez-Adorno, I. Markov, D. Pinto, N. Loya

Fuzzy Clustering and Its Applications, Michelangelo Room  
Chairs: Jairo Salazar and Mohammad Hossein Fazel Zarandi

- 2:30- 2:50 pm FuzzyVD: An algorithm that uses Fuzzy Logic and Fuzzy Systems to estimate the number of endmembers present in a hyperspectral image  
Jairo Salazar, Andres Mendez
- 2:50- 3:10 pm Possibilistic c-Means for considering of Neutron and Density Porosity  
Pardis Noori Koohani, Mohammad Hossein Fazel Zarandi, Navid Seifipour
- 3:10- 3:30 pm Incremental Fuzzy Clustering for an Adaptive Backgammon Game  
Tannaz Sattari Tabrizi, Mohammad Reza Khoie, Shahram Rahimi

Special Session: Fuzzy Mathematical Analysis and Applications, Part 3, Van Gogh Room  
Chairs: Luciano Stefanini and Yurilev Chalco-Cano

- 2:30- 2:50 pm Interval-valued functions in a quotient space  
Elder J. Villamizar-Roa, Y. Chalco-Cano, H. Roman-Flores
- 2:50- 3:10 pm A study on the dynamics and control of the soybean aphid  
Magda S. Peixoto, Laecio C. Barros, Rodney C. Bassanezi, Odair A. Fernandes
- 3:10- 3:30 pm A note on fuzzy-transform approximation of fuzzy numbers  
Lucian Coroianu, Luciano Stefanini

Dynamical Systems and Fuzzy Techniques: Dynamics of Fuzzy Systems and Fuzzy Technique  
for Studying Dynamical Systems: Al-Khwarizmi Room  
Chairs: Derek T. Anderson and Oscar Castillo

- 2:30- 2:50 pm Proposed Augmentation of the Bat Algorithm using fuzzy logic for  
dynamic parameter adaptation  
Jonathan Perez, Fevrier Valdez, Oscar Castillo
- 2:50- 3:10 pm Multi-Criteria Based Learning of the Choquet Integral using Goal  
Programming  
Muhammad Aminul Islam, Derek T. Anderson, Timothy C. Havens
- 3:10- 3:30 pm Bifurcations of Fuzzy Solutions  
Marina T. Mizukoshi, Moiseis dos Santos Ceconello

3:30- 4:00 pm coffee break, Bits and Bytes Cafe

#### **4:00-5:20 PARALLEL SESSIONS**

Special Session: Similarity and Association Measures, Part 2, Plato Room  
Chairs: Ildar Batyrshin and Vladik Kreinovich

- 4:00- 4:20 pm Association Measures on the Set of Subintervals of  $[0,1]$   
I. Batyrshin, L. A. Villa-Vargas, V. Solovyev
- 4:20- 4:40 pm Fuzzy Similarity for Function Computation Model  
Chin-Liang Chang
- 4:40- 5:00 pm Graded Data Dependencies in Relational Databases: Reasoning with  
Similarity of Time  
Jan Triska, Vilem Vychodil

Fuzzy Reasoning, Michelangelo Room

Chairs: Daniel G. Schwartz and Cezary Z. Janikow

- 4:00- 4:20 pm On the Probability of a Fuzzy Event, with Application to Nonmonotonic Reasoning  
Daniel G. Schwartz
- 4:20-4:40 Osherson, Smith and Elkan  
Mark J. Wierman
- 4:40- 5:00 pm FID 3.5: Overview and Experimentation  
Cezary Z. Janikow, Eryn R. Cantrell
- 5:00- 5:20 pm Degree of Coverage of Radial Rule Bases  
David Coufal

Special Session: Fuzzy Mathematical Analysis and Applications, Part 4, Van Gogh Room

Chairs: Luciano Stefanini and Yurilev Chalco-Cano

- 4:00- 4:20 pm Links between ranking and total ordering for fuzzy integers  
Li Zhang, Zhenyuan Wang
- 4:20- 4:40 pm Numerical solution of fuzzy differential equations by fuzzy-transform  
Davide Radi, Luciano Stefanini
- 4:40- 5:00 pm Fuzzy Linear Systems Start with Interval Linear Systems – A Unified Approach  
Weldon A. Lodwick
- 5:00- 5:20 pm Applied Z-numbers  
Purvag Patel, Shahram Rahimi, Elham Khorasani

Biomedical Applications of Fuzzy Techniques, Part 2: Al-Khwarizmi Room

Chair: Alexandra O. Andrade and Dan Tavrov

- 4:00-4:20 am Analysis of fuzzy morphology in spore counts of mycorrhizal fungi  
Alexandra O. Andrade, Roque M. P. Trindade, Vanessa B. F. Neves, Alecio S. Barros, Isadora B. Soares, Divino L. Miguel, Reginaldo P. Costa, Regivan H. N. Santiago, Ana Maria G. Guerreiro
- 4:20-4:40 am The counting of mycorrhizal fungi spores using fuzzy mathematical morphology  
Alexandra O. Andrade, Roque M. P. Trindade, Vanessa B. F. Neves, Deise S. Maia, Divino Levi Miguel, Regivan H. N. Santiago, Ana Maria G. Guerreiro

- 4:40- 5:00 pm Memetic Approach to Anonymizing Groups That Can Be Approximated By a Fuzzy Inference System  
Dan Tavrov

**5:30- 6:00 pm transportation to banquet**

**6:00- 9:00 pm Banquet at Bear Creek Country Club**

**9:00-10:00 pm transportation from banquet**

## **WEDNESDAY AUGUST 19, 2015**

### **9:00-10:00 PLENARY**

- 9:00- 10:00 am, Chair: William Melek, Plenary Talk by Vladik Kreinovich, Plato Room (University of Texas at El Paso, Texas, USA) Formalizing the Informal, Precisiating the Imprecise: How Fuzzy Logic Can Help Mathematicians and Physicists by Formalizing Their Intuitive Ideas

10:00-10:20 am coffee break, Bits and Bytes Cafe

### **10:20-12:00 PARALLEL SESSIONS**

Special Session: Fuzzy Pattern Recognition and Data Mining, Plato Room  
Chairs: Mohammad H. Fazel Zarandi, Burhan Turksen, and Reyhaneh Gamasae

- 10:20-10:40 am Fuzzy Comparison Dashboard for Multi-Objective Evolutionary Applications: An Implementation in Supply Chain Planning  
Mohammad Hossein Fazel Zarandi, Mosahar Tarimoradi, Mohammad Hossein Alavidoost, Mohsen Akbarpour Shirazi
- 10:40-11:00 am Fuzzy Clustering Rule-based Expert System for Stock Price Movement Prediction  
Behnoush Shakeri, Mohammad Hossein Fazel Zarandi, Mosahar Tarimoradi, I. B. Turksen
- 11:00-11:20 am A fuzzy system dynamics approach for evaluation of Iran's new demographic policy  
Afshin Khadangi, A. Ghahari, M. H. Fazel Zarandi



- 11:20-11:40 am Trust Evaluation for Buyer-Supplier Relationship Concerning Fuzzy Approach  
Z. Moattar Hussein, M. H. Fazel Zarandi, S. M. Moattar Hussein
- 11:40-12:00 am Sparse kernel machines based on type-2 fuzzy clustering for demand forecasting  
Reyhaneh Gamasae, Mohammad Hossein Fazel Zarandi

Fuzzy Classification and Its Applications, Michelangelo Room

Chairs: Scott Dick and Patricia Melin

- 10:20- 10:40 pm Disaggregating Household Power Loads via Semi-Supervised Multi-Label Classification  
Ding Li, Kyle Sawyer, Scott Dick
- 10:40- 11:00 pm A new classification method based on LVQ neural networks and Fuzzy Logic  
Jonathan Amezcua, Patricia Melin, Oscar Castillo
- 11:00- 11:20 pm Classification of Small Boats Using Fuzzy Classifier  
Etty Sierra, Juan Contreras

Special Session: Inter-relation between interval and fuzzy techniques Part 1, Van Gogh Room

Chairs: Martine Ceberio and Vladik Kreinovich

- 10:20-10:40 am Developing an interval Type-2 TSK fuzzy logic controller  
Nnamdi Enyinna, Ali Karimodini, Daniel Opoku, Abdollah Homaifar, Shannon Arnold
- 10:40-11:00 pm Summation of linguistic numbers  
Boris Kovalerchuk
- 11:00-11:20 am Simple linear interpolation explains all usual choices in fuzzy techniques: membership functions, t-norms, t-conorms, and defuzzification  
Vladik Kreinovich, Jonathan Quijas, Esthela Gallardo, Caio De Sa Lopes, Olga Kosheleva, Shahnaz Shahbazova
- 11:20-11:40 am Coming up with a good question is not easy: a proof  
Joe Lorkowski, Luc Longpre, Olga Kosheleva, Salem Benferhat
- 11:40-12:00 am Symbolic Aggregate Approximation (SAX) under interval uncertainty  
Chrysostomos D. Stylios, Vladik Kreinovich

12:00-1:00 pm lunch, Bits and Bytes Cafe

## 1:00-2:00 PARALLEL SESSIONS

Mathematics of Fuzzy, Plato Room

Chairs: Sergei Ovchinnikov and Regivan H.N. Santiago

- 1:00- 1:20 pm Well-Graded Families of Fuzzy Sets  
Sergei Ovchinnikov
- 1:20- 1:40 pm Ranking of L-R fuzzy numbers  
Adrian I. Ban, Lucian Coroianu
- 1:40- 2:00 pm Properties of Uniformly Strongly Prime Fuzzy Ideal  
Flaulles B. Bergamaschi, Regivan H.N. Santiago

Computing with Words, Michelangelo Room

Chairs: Boris Kovalerchuk and John T. Rickard

- 1:00- 1:20 pm Computing With Words in Fuzzy Cognitive Maps  
John T. Rickard, Janet Aisbett, Ronald R. Yager
- 1:20- 1:40 pm Computing with words beyond quantitative words: incongruity modeling  
Boris Kovalerchuk, Andrew Smigaj
- 1:40- 2:00 pm Application of Fuzzy Cognitive Maps to Electricity Consumption Prediction  
Elpiniki Papageorgiou, Katarzyna Poczeta

Special Session: Inter-relation between interval and fuzzy techniques Part 2, Van Gogh Room

Chairs: Martine Ceberio and Vladik Kreinovich

- 1:00- 1:20 pm Sometimes, it is beneficial to process different types of uncertainty separately  
Chrysostomos D. Stylios, Andrzej Pownuk, Vladik Kreinovich
- 1:20- 1:40 pm How to speed up software migration and modernization: successful strategies developed by precisiating expert knowledge  
Francisco Zapata, Octavio Lerma, Leobardo Valera, Vladik Kreinovich

Special Session: Soft Computing for Unmanned Aerial Vehicles (UAVs), Van Gogh Room  
Chairs: Martine Ceberio and Vladik Kreinovich

- 1:40- 2:00 pm Model reduction: why it is possible and how it can potentially help to control swarms of Unmanned Aerial Vehicles (UAVs)  
Martine Ceberio, Leobardo Valera, Olga Kosheleva, Rodrigo Romero

Special Session: Type-2 Fuzzy Systems and Modeling, Part 1, Al-Khwarizmi Room  
Chairs: Mohammad H. Fazel Zarandi, Burhan Turksen, and Reyhaneh Gamasae

- 1:00-1:20 am Response Integration in Modular Neural Networks using Choquet Integral with Interval Type 2 Sugeno Measures.  
Gabriela E. Martinez, Olivia Mendoza, Juan R. Castro, A. Rodriguez-Diaz, Patricia Melin, Oscar Castillo
- 1:20-1:40 am Edge detection method based on interval type-2 fuzzy systems for color images  
Claudia I. Gonzalez, Juan R. Castro, Olivia Mendoza, A. Rodriguez-Diaz, Patricia Melin, Oscar Castillo
- 1:40-2:00 am A new interval type-2 fuzzy possibilistic C-means clustering algorithm  
Elid Rubio, Oscar Castillo, Patricia Melin

## **2:00-3:00 PARALLEL SESSIONS**

Fuzzy Sets of Higher Types, Plato Room  
Chairs: Mohammad H. Fazel Zarandi and Raghavendran Srinivasan

- 2:00- 2:20 pm Ranking members of sets with uncertain center by using general type-2 fuzzy membership values  
Samira Malek Mohamadi Golsefid, Mohammad H. Fazel Zarandi, Burhan Turksen
- 2:20- 2:40 pm General type-2 fuzzy degree of nodes in multi central social networks set NAFIPS co-authorship network  
Samira Malek Mohamadi Golsefid, Mohammad Hossein Fazel Zarandi, Susan Bastani
- 2:40- 3:00 pm Properties On Intuitionistic Fuzzy Sets Of Third Type  
Raghavendran Srinivasan, Syed Siddiqua Begum

Fuzzy Data Processing and Modeling, Michelangelo Room  
Chairs: Martine De Cock and Fernando Gomide

- 2:00- 2:20 pm Evolving Possibilistic Fuzzy Modeling for Financial Interval Time Series Forecasting  
Leandro Maciel, Fernando Gomide, Rosangela Ballini
- 2:20- 2:40 pm How to Measure Qualitative Data  
Vadim L. Stefanuk
- 2:40- 3:00 pm Distributed Fuzzy Rough Prototype Selection for Big Data Regression  
Sarah Vluymans, Hasan Asfoor, Yvan Saeys, Chris Cornelis, Matthew Tolentino, Ankur Teredesai, Martine De Cock

Business Applications, Van Gogh Room  
Chairs: Victor Taratukhin

- 2:00- 2:20 pm Fuzzy Intelligent Agent-based Expert System to Keep Information Systems Aligned with the Strategy Plans: A Novel Approach toward SISF  
Mohammad Hossein Fazel Zarandi, Mosahar Tarimoradi, Mohsen Akbarpour Shirazi, I. B. Turksen
- 2:20- 2:40 pm A fuzzy logic approach for product configuration and requirements management  
Yulia Yadgarova, Victor Taratukhin
- 2:40- 3:00 pm Formalized Approach for Managing IS-Enabled Organizational Transformation  
Yury Kupriyanov, Victor Taratukhin

Special Session: Type-2 Fuzzy Systems and Modeling, Part 2, Al-Khwarizmi Room  
Chairs: Mohammad H. Fazel Zarandi, Burhan Turksen, and Reyhaneh Gamasae

- 2:00-2:20 am Fuzzy Rule based Expert System for Diagnosis of Lung Cancer  
Farzad Vasheghani Farahani, M. H. Fazel Zarandi, Abbas Ahmadi
- 2:20-2:40 am A Type-2 Fuzzy Intelligent Agent Based on Sparse Kernel Machines for Reducing Bullwhip Effect in Supply Chain  
Reyhaneh Gamasae, Mohammad Hossein Fazel Zarandi, I. Burhan Turksen

Mathematics of Fuzzy, Al-Khwarizmi Room  
Chair: Vladik Kreinovich

- 2:00- 2:20 pm Approximation properties of Lukasiewicz fuzzy systems  
Barnabas Bede, I. J. Rudas, E.D. Schwab, G. Schwab

3:00- 3:30 pm coffee break, Bits and Bytes Cafe

**3:30-4:30 PLENARY**

- 3:30- 4:30 pm, Chair: Martine de Cock, Plenary talk by Gad Levy in Plato room  
(NorthWest Research Associates, Redmond, Washington, USA) Lower-Dimensional  
Features in climate models and their fuzzy modeling