MFOI-2020

January 13–15, 2021
Kyiv, Ukraine

ABOUT MFOI

The 2020 edition of the annual Conference on Mathematical Foundations of Informatics is intended to add synergy to the efforts of the researchers working on development of the mathematical foundations for computer science, also known as informatics.

УКРАЇНСЬКЕ ЛОГІЧНЕ ТОВАРИСТВО
UKRAINIAN LOGIC SOCIETY
ISLAI

ORGANIZERS

- Taras Shevchenko National University of Kyiv, Ukraine
- Institute of Mathematics and Computer Science, Chisinau, Moldova
- Alexandru Ioan Cuza University of Iasi, Romania
- International Society for Logic and Artificial Intelligence, Chisinau, Moldova
- Ukrainian Logic Society, Ukraine

CO-CHAIRS:

- Mykola Nikitchenko (Kyiv, Ukraine)
- Svetlana Cojocaru (Chisinau, Moldova)
- Adrian Iftene (Iasi, Romania)
- Ioachim Drugus (Chisinau, Moldova)

WEBSITE:

http://mfoi2020.inf.ua/

EMAIL:

conference.mfoi2020@gmail.com

The conference will be held in online mode via ZOOM.

ZOOM LINK TO ALL MFOI SESSIONS:

https://us02web.zoom.us/j/2843226987

Time is EET (Romania-Moldova-Ukraine time)

PROGRAM

of the VI International Conference on

MATHEMATICAL FOUNDATIONS OF INFORMATICS MFOI-2020

January 13-15, 2021, Kyiv, Ukraine

This year MFOI is timed to the 3rd World Logic Day

http://www.logica-universalis.org/wld3

On January 14, 2019 it was organized the First World Logic Day in about 60 locations all over the world. Based on this, a detailed report, by Jean-Yves Beziau, was presented in April 2019 in Paris to the Ambassador of Brazil at UNESCO, Maria Edileuza Fontenele Reis, in order for this day to be a world UNESCO day. After the approval by the Brazilian government, the Ambassador presented the proposal during the meeting of the UNESCO Executive Council, backed by 17 other countries, and it was approved on October 17, 2019 and became part of the calendar of UNESCO international days. January 14, 2020 was organized the 2nd World Logic Day under the auspices of UNESCO. After two successful editions organized by the Logica Universalis Association (LUA), the 3rd edition is managed by UNESCO through CIPSH.

The 3rd World Logic Day in Ukraine, Moldova, Romania

- VI International Conference on Mathematical Foundations of Informatics MFOI-2020 (http://mfoi2020.inf.ua/index.html)

- Symposium on Logic and Artificial Intelligence (SIAI), Chisinau, Moldova (https://islai.org/.)

- Moldovan Prizes in Logic and Artificial Intelligence (https://logic-prize-moldova.islai.org/.)

- Romanian Prizes in Logic and Artificial Intelligence (https://logic-prize-romania.islai.org/.)

- Ukrainian Logic Society Prize – 2021 (http://logic.net.ua/content/ukrainian-logic-society-prize-%E2%80%93-2021)

- Invited Lectures (see this Program)

OPENING

10:00 – 12:15

Chairs: Prof. Svetlana Cojocaru, Prof. Ioachim Drugus

- Dean of the Faculty of Computer Science and Cybernetics of Taras Shevchenko National University of Kyiv:

  Prof. **Anatoly Anisimov**

- MFOI Co-Chairs: Prof. **Svetlana Cojocaru**, Prof. **Mykola Nikitchenko**, Prof. **Adrian Iftene**, Prof**. Ioachim Drugus**

Invited talks

- **10:15-10:55 Adrian Iftene (Romania)**. Using Artificial Intelligence in Medicine.

- **10:55-11:35 Sergiy Kryvyi (Ukraine)**. Algebra, Informatics, and Programming

- **11:35-12:15 Mykola Nikitchenko (Ukraine).** Defining Program Logics: Three-level Scheme

12:15 -13:30 Lunch break

SESSION 1 (SIAI)

13:30 - 15:00

Chair: Prof. Adrian Iftene

- 13:30-14:00 **Stefan-Claudiu Susan**. A practical implementation of Natural Deduction in Propositional Logic

- 14:00-14:30 **Ioachim Drugus**. Towards a Non-associative Model of Language

- 14:30-15:00 **Tudor Bumbu** and **Iulian Cernei**. Ensuring Access to the Moldovan Legacy using Elements of Artificial Intelligence

15:00 - 15:15 Break

SESSION 2 (MFOI)

15:15 - 18:00

Chair: Prof. Ioachim Drugus

- 15:15-15:35 **Andrei Alexandru** and **Gabriel Ciobanu**. Properties of Finitely Supported Binary Relations between Atomic Sets

- 15:35-15:55 **Andrei Alexandru** and **Gabriel Ciobanu**. Finitely Supported Mappings Defined on the Finite Powerset of Atoms in FSM

- 15:55-16:15 **Radu-Matei Lipan** and **Adrian Iftene**. Iasi Botanic Garden App

- 16:15-16:35 **Bianca Chirica** and **Adrian Iftene**. Enhancing the Visit of the Botanical Garden of Iasi with the Help of Smart Devices and Augmented Reality

- 16:35-16:55 **Vasyl Ustimenko** and **Oleksandr Pustovit**. On the implementations of new multivariate public keys based on transformations of linear degree

Invited talk

- **17:00-18:00 Alexei Muravitsky (USA).** On Nonmonotonic Consequence Relations

JANUARY 14, 2021

Invited talks

- **10:00 -10:45 Grygoriy Zholtkevych (Ukraine)**. Category-theoretic Approach to Modelling Program Domain Structure and Its Behaviour

- **10:45 -11:30 Andrei Arusoaie (Romania)**. Certification in Matching Logic

Ukrainian Logic Contest Results: 11:30 -12:00

12:00 -13:00 Lunch break

- 13:00-13:20 **Alexandru Colesnicov**, **Ludmila Malahov**, **Svetlana Cojocaru** and **Liudmila Burtseva**. Development of a platform for processing heterogeneous printed documents

- 13:20-13:40 **Olesea Caftanatov**. State of the Art: Augmented reality Business Cards

- 13:40-14:00 **Stefan Stratulat, Gheorghe Morari, Dumitru Prijilevschi, and Tudor Bumbu**. A Disambiguation Model for Natural Language Processing

- 14:00-14:20 **Elena Kuznetsov**, **Eugene Kuznetsov**. Generalized boolean algebras, boolean rings and extensional algebras

- 14:20-14:40 **Cristian Vararu** and **Adrian Iftene**. Methods of Recognizing the Hand and Gestures

- 14:40-15:00 **Victor Pulbere** and **Adrian Iftene**. Using F.A.S.T. Test to Detect Stroke

15:00 - 15:20 Break

- 15:20-15:40 **Grygoriy Zholtkevych** and **Maksym Labzhaniia**. Discrete System Modelling: Dialgebraic Approach

- 15:40-16:00 **Oleksandr Letychevskyi**, **Volodymyr Peschanenko**, **Maksym Poltoratskyi**, **Yuliia Tarasich**, **Serhii Horbatiuk** and **Viktor Horbatiuk**. One Approach to Formal Verification of Distributed Ledger Technologies on the Blockchain Technologies Example

- 16:00-16:20 **Gennadi Malaschonok** and **Andriy Ivashkevich**. Quick Recursive QR Decomposition

- 16:20-16:40 **Alexander Lyaletski**. Evidence Algorithm: 50 Years of Development

SESSION 3 (ISLAI-MFOI)

13:00 - 15:00

Chair: Prof. Mykola Nikitchenko

SESSION 4 (MFOI)

15:20-17:00

Chair: Prof. Adrian Iftene

WORLD LOGIC DAY MEETING

17:00 - 18:00 **International Welcome Ceremony of the World Logic Day:**

http://www.logica-universalis.org/wld3

The link to a YouTube channel:

https://www.youtube.com/channel/UCPS1c5ApuwjuCV9UjXHUN4w/featured

18:00 - 20:00 Break

WORLD LOGIC DAY LECTURE

20:00-21:00 Lecture devoted to **WORLD LOGIC DAY**

- **Moshe Vardi.** From Aristotle to the iPhone

REGISTER HERE

Abstract: Logic started as a branch of philosophy, going back to Greeks, who loved debates, in the classical period. Computers are relatively young, dating back to World War II, in the middle of the 20th century. This talk tells the story of how logic begat computing, tracing the surprising path from Aristotle to the iPhone. This is a story full of both intellectual drama, as well as real-life drama, with most of the characters dying young, miserable, or both.

It will start at 12:00 pm CST that is 20:00 EET.

WORLD LOGIC DAY LECTURE

22:00-24:00 Lecture devoted to **WORLD LOGIC DAY**

- **Martin Davis**. Algorithms, Equations, and Logic

To participate, please, access this link to register. You will receive a confirmation email containing the meeting password and instructions for joining the meeting. It will start at 2:00 pm CST that is 22:00 EET.

SESSION 5 (MFOI)

10:00 - 12:45

Chair: Prof. Mykola Nikitchenko

- 10:00-10:15 **Camelia-Maria Milut**. Speech Recognition in the Medical Domain with Application in Patient Monitoring

- 10:15-10:30 **Victor Shcherbacov**, **Dmitriy Moldovyan** and **Aleksandr Moldovyan**. Structure of three types of the 6-dimensional nite non-commutative associative algebras containing a set of global single sided units

- 10:30-10:45 **Cristian Ninicu** and **Adrian Iftene**. Detection of Geographical Areas where there are Discussions about Epidemics Based on Twitter

- 10:45-11:00 **Adrian Gotca** and **Adrian Iftene**. ECG Biometrics: Experiments with SVM

- 11:00-11:15 **Matei-Alexandru Cioata** and **Adrian Iftene**. Recognition of Guitar Chords using the Discrete Fourier

- 11:15-11:30 **Irina Cercel** and **Adrian Iftene**. Planetarium - An Augmented Reality Application

- 11:30-11:45 **Daniela Gifu**. Tracing Economic Crisis Prediction

- 11:45-12:00 **Ioan-Alexandru Mititelu** and **Adrian Iftene**. Thread Up - Application for Analysis of the Trending

- 12:00-12:15 **Dmytro Krukovets**. Dynamic Time Warping for uncovering dissimilarity of regional wages in Ukraine

- 12:15-12:30 **Andrey Zemtsov**. Image Watermarking for Educational Content Copyright Protection Using Discrete Wavelet Transform

- 12:30-12:45 **Ievgen Ivanov**. On Generalizations of Real Induction