NAFIPS 2022 Conference Schedule

31st May – 2nd June 2022

Saint Mary's University, Halifax, Canada

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<tr><td>08:30h - 09:00h</td><td>REGISTRATION</td><td rowspan="2">Technical Session 4</td><td rowspan="3">Panel: Dr. Kelly Cohen</td><td rowspan="3">Special Session:
Explainable Fuzzy AI Challenge (XFC 2022)</td></tr>
<tr><td>09:00h - 09:30h</td><td>OPENING CEREMONY</td></tr>
<tr><td>09:30h - 10:00h</td><td rowspan="2">Plenary Talk 1: Dr. Chelsea Sabo</td><td rowspan="2">Plenary Talk 2: Dr. Sageev Oore</td></tr>
<tr><td>10:00h - 10.30h</td><td></td><td></td><td></td></tr>
<tr><td>10:30h - 10:45h</td><td>Tea/ Coffee Break</td><td>Tea/ Coffee Break</td><td colspan="2">Tea/ Coffee Break</td></tr>
<tr><td>10:45h - 11:05h</td><td rowspan="6">Special Session: Interval Uncertainty

Technical Session 1</td><td rowspan="6">Plenary Talk 3: Dr. Stan Matwin
(11:00 am - 12:00 pm)

Special Session: Lattice Computing</td><td colspan="2" rowspan="6">Technical Session 7</td></tr>
<tr><td>11:05h - 11:25h</td></tr>
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<tr><td>12:25h - 12:45h</td></tr>
<tr><td>12:45h - 13:45h</td><td>Lunch/ NAFIPS Board Meeting</td><td>Lunch/ NAFIPS General Meeting</td><td colspan="2">CLOSING CEREMONY (12:45h – 13:00h)</td></tr>
<tr><td>13:45h - 14:05h</td><td rowspan="4">Technical Session 2</td><td rowspan="4">Technical Session 5</td><td colspan="2" rowspan="9">TRIP to Peggy's Cove (13:00h onwards)</td></tr>
<tr><td>14:05h - 14:25h</td></tr>
<tr><td>14:25h - 14:45h</td></tr>
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<tr><td>15:05h - 15:20h</td><td>Tea/ Coffee Break</td><td>Tea/ Coffee Break</td></tr>
<tr><td>15:20h - 15:40h</td><td rowspan="4">Technical Session 3</td><td rowspan="4">Technical Session 6</td></tr>
<tr><td>15:40h - 16:00h</td></tr>
<tr><td>16:00h - 16:20h</td></tr>
<tr><td>16:20h - 16:40h</td></tr>
<tr><td>17:00h onwards</td><td>Welcome Reception</td><td>Conference Banquet</td></tr>
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*** A Pre-Conference Workshop on "Constraint Programming and Decision Making CoProD'22" will be held on 30th May 2022, Monday from 2.00 pm – 6.00 pm. More details of the workshop can be found on the conference website.**

DAY 1 - 31st May 2022, Tuesday

Time Schedule	Location	Event	Activity
08:30h - 09:00h	S126	Registration Desk	Conference Kit Collection
09:00h - 09:30h	S126D	Opening Ceremony	Opening Ceremony and Welcome Address
09:30h - 10:00h		Plenary Talk 1	**Dr. Chelsea Sabo** *Staff A/AI Research Engineer at Lockheed Martin*
10:00h - 10:30h			
10:30h - 10:45h	S126F Lounge	Tea/ Coffee Break	Beverages and snacks will be served in the Lounge
10:45h - 11:05h	S126D	**Special Session:** Interval Uncertainty **Session Chairs:** Martine Ceberio Vladik Kreinovich	**Paper #2** INTERVAL: How to elicit complex-valued fuzzy degrees *Laxman Bokati, Olga Kosheleva and Vladik Kreinovich*
11:05h - 11:25h			**Paper #4** Special tolerance left solution for course assignment problem with interval workload constraint *Warintorn Pongsumrankul, Phantipa Thipwiwatpotjana and Artur Gorka*
11:25h - 11:45h			**Paper #34** Generating Interval Type-2 Fuzzy Inputs From Smoothed Data For Fuzzy Rule-Based Systems *Peter Sussner and Tiago da Silva Alencar*
11:45h - 12:05h			**Paper #40** The Constraint Interval Theory: A solution for Interval Differential Equations *Marina Tuyako Mizukoshi and Weldon Lodwick*
12:05h - 12:25h		Technical Session 1	**Paper #9** Data Driven Level Set Method in Fuzzy Modeling and Forecasting *Leandro Maciel, Rosangela Ballini and Fernando Gomide*
12:25h - 12:45h			**Paper #26** An approach to simulation of fuzzy linguistic variables *Juan Carlos Figueroa-García, Jhoan Sebastian Tenjo García and Jennifer Soraya Ramos Cuesta*
12:45h - 13:45h	McNally Main	Lunch	Lunch will be served in McNally Main

13:45h - 14:05h	S126D	Technical Session 2	**Paper #1** Why Sine Membership Functions *Sofia Holguin, Javier Viana, Kelly Cohen, Anca Ralescu and Vladik Kreinovich*
14:05h - 14:25h			**Paper #7** Neural Network-Based Fault-Tolerant Control of MIMO Uncertain System: Passive Approach *Sejal Raval, Himanshukumar Patel, Sagar Patel and Vipul Shah*
14:25h - 14:45h			**Paper #10** Genetic Fuzzy Controller for the Homicidal Chauffeur Differential Game *Lynn Pickering and Kelly Cohen*
14:45h - 15:05h			**Paper #11** Single Hidden Layer CEFYDRA: Cluster-first Explainable FuzzY-based Deep self-Reorganizing Algorithm *Javier Viaña, Stephan Ralescu, Vladik Kreinovich, Anca Ralescu and Kelly Cohen*
15:05h - 15:20h	S126F Lounge	Tea/ Coffee Break	Beverages and snacks will be served in the Lounge
15:20h - 15:40h	S126D	Technical Session 3	**Paper #16** A New Weighting Method in Fuzzy Multi-criteria Decision Making: Selected Element Reduction Approach (SERA) *Esra Çakir, Mehmet Alİ TaŞ and Zİya Ulukan*
15:40h - 16:00h			**Paper #18** Genetically Trained Fuzzy Cognitive Maps for Effects Based Operations *Zachariah Phillips and Kelly Cohen*
16:00h - 16:20h			**Paper #22** Pulsar Candidate Selection Using a Genetic Fuzzy System *Matthew Verbryke and Kelly Cohen*
16:20h - 16:40h			**Paper #24** Flutter Mitigation via Fuzzy Gain Scheduling of a Passivity-Based Controller *Jared Burton and Kelly Cohen*
16:40h onwards	S126D	Welcome Reception	Welcome reception will be held at S126D

DAY 2 – 1st June 2022, Wednesday

Time Schedule	Location	Event	Activity
08:30h - 08:50h	S126D	Technical Session 4	**Paper #13** Initialization and Plasticity of CEFYDRA: Cluster-first Explainable FuzzY-based Deep self-Reorganizing Algorithm *Javier Viaña, Stephan Ralescu, Vladik Kreinovich, Anca Ralescu and Kelly Cohen*
08:50h - 09:10h			**Paper #33** A note on Caputo fractional derivative on space of linearly correlated fuzzy numbers *Michele Martins Lopes, Francielle Santo Pedro, Beatriz Laiate, Estevão Esmi and Laécio Carvalho Barros*
09:10h - 09:30h			**Paper #36** Synthesis chemical reaction model via p-fuzzy systems *Vinícius Wasques, Francielle Santo Pedro, Estevão Esmi and Laécio C. Barros*
09:30h - 10:00h	S126D	Plenary Talk 2	**Dr. Sageev Oore** *Faculty of Computer Science* *Dalhousie University*
10:00h - 10:30h			
10:30h - 11:00h	S126F Lounge	Tea/ Coffee Break	Beverages and snacks will be served in the Lounge
11:00h - 11:30h	S126D	Plenary Talk 3	**Dr. Stan Matwin** *Professor & Director, Institute for Big Data Analytics* *Dalhousie University*
11:30h - 12:00h			
12:00h - 12:20h	S126D	**Special Session:** Lattice Computing **Session Chairs:** Peter Sussner Vassilis Kaburlasos	**Paper #31** Recent Approaches Toward Lattice Computing: Agricultural Yield Prediction by Difference Equations on Data-Induced Cumulative Possibility Distributions *Vassilis G. Kaburlasos, Christos Bazinas, Eleni Vrochidou and Eleftherios Karapatzak*
12:20h - 12:40h			**Paper #39** Subsethood Measures on a Bounded Lattice of Continuous Fuzzy Numbers with an Application in Approximate Reasoning *Peter Sussner and Roberto Pereira Torres*

12:40h - 13:45h	McNally Main	Lunch	Lunch will be served in McNally Main
13:45h - 14:05h	S126D	Technical Session 5	**Paper #6** Why Ideas First Appear in Informal Form? Why It Is Very Difficult to Know Yourself? Fuzzy-Based Explanation *Miroslav Svitek and Vladik Kreinovich*
14:05h - 14:25h			**Paper #15** Why Gaussian Copulas Are Ubiquitous in Economics: Fuzzy-Related Explanation} *Chon Le, Olga Kosheleva and Vladik Kreinovich*
14:25h - 14:45h			**Paper #17** Use of Fuzzy PID Controller for Pitch Control of a Wind Turbine *Sameer Pokhrel, Anoop Sathyan, Sameh A. Eisa and Kelly Cohen*
14:45h - 15:05h			**Paper #21** Genetic Fuzzy System for Pitch Control on a F-4 Phantom Baptiste Courcier, Samuel Richard Desjardins, Christophe Farges, Frank Cazaurang, Kelly Cohen, *Lynn Pickering and Javier Viaña Perez*
15:05h - 15:20h	S126F Lounge	Tea/ Coffee Break	Beverages and snacks will be served in the Lounge
15:20h - 15:40h	S126D	Technical Session 6	**Paper #5** Hybrid Fuzzy-LQR Control for Time Optimal Spacecraft Docking *Kyle Dunlap and Kelly Cohen*
15:40h - 16:00h			**Paper #8** Can Physically-Trained Genetic Fuzzy Learning Algorithm Improve Pitch Control in Wind Turbines? *Anoop Sathyan, Sameh Eisa and Kelly Cohen*
16:00h - 16:20h			**Paper #30** Analyzing the Sars-Cov-2 pandemic outbreak using fuzzy sets and the SIR model *Moiseis dos Santos Cecconello, Michael Macedo Diniz and Rodney Carlos Bassanezi*
16:20h - 16:40h			**Paper #32** On a new contrapositivisation technique for fuzzy implications constructed from grouping functions *Fernando Neres, Regivan Santiago and Benjamín Bedregal*
16:40h onwards	TBD	Conference Banquet	Conference Banquet

DAY 3 – 2nd June 2022, Thursday

<table>
<tr><th>Time Schedule</th><th>Location</th><th>Event</th><th colspan="2">Activity</th></tr>
<tr><td>08:30h - 09:00h</td><td rowspan="3">S126D/ McNally Main</td><td rowspan="3">Parallel Sessions
(more details below)</td><td>Panel: Explainable AI for Bio-Medical Applications

Panel Moderator: Prof. Kelly Cohen, Brian H. Rowe Endowed Chair, College of Engineering & Applied Science, University of Cincinnati</td><td>Special Session: XFC 2022

Organizers:
▪ Tim Arnett
▪ Javier Viana
▪ Lynn Pickering
▪ Brandon Kunkel</td></tr>
<tr><td>09:00h - 09:30h</td></tr>
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<tr><td>10:00h - 10:30h</td><td>S126F Lounge</td><td>Tea/ Coffee Break</td><td colspan="2">Beverages and snacks will be served in the Lounge</td></tr>
<tr><td>10:45h - 11:05h</td><td rowspan="6">S126D</td><td rowspan="6">Technical Session 7</td><td colspan="2">Paper #12
Multiple Hidden Layered CEFYDRA: Cluster-first Explainable FuzzY-based Deep self-Reorganizing Algorithm
Javier Viaña, Stephan Ralescu, Vladik Kreinovich, Anca Ralescu and Kelly Cohen</td></tr>
<tr><td>11:05h - 11:25h</td><td colspan="2">Paper #23
Semi-Supervised Physics-Informed Genetic Fuzzy System for IoT BLE Localization
Dmitry Manasreh, Safaa Swaleh, Kelly Cohen and Munir D. Nazzal</td></tr>
<tr><td>11:25h - 11:45h</td><td colspan="2">Paper #25
Classification of Rice using Genetic Fuzzy Cascading System
Dipin Nair, Kelly Cohen and Manish Kumar</td></tr>
<tr><td>11:45h - 12:05h</td><td colspan="2">Paper #35
An experimental study on fuzzy Markov chains under Mn generalized mean relation
Juan Carlos Figueroa-García, Yurilev Chalco-Cano and Roman Neruda</td></tr>
<tr><td>12:05h - 12:25h</td><td colspan="2">Paper #37
Proposal of a Novel Python-based Fuzzy Systems Library - Preliminary Results
Eric Zander, Alejandro Herrera and Barnabas Bede</td></tr>
<tr><td>12:25h - 12:45h</td><td colspan="2">Paper #38
Commonsense-Continuous Dynamical Systems -- Stationary States, Prediction, and Reconstruction of the Past: Fuzzy-Based Analysis
Olga Kosheleva and Vladik Kreinovich</td></tr>
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12:45h - 13:00h	S126	**CLOSING CEREMONY**	Best Paper Awards and Vote of Thanks
13.00h onwards		TRIP	Trip to Peggy's Cove (Boxed lunch will be provided)

PANEL: 8:30h – 10:30h

Title: Explainable AI for Bio-Medical Applications

Panel Moderator: Prof. Kelly Cohen, Brian H. Rowe Endowed Chair, College of Engineering & Applied Science, University of Cincinnati

Panel Details: Each Panelist will present for 8-10 minutes about their subjective perspective on Explainable AI and it importance to Health applications. Moreover, the panelist will also provide thoughts on the challenges facing AI for Health implementation and the potential Explainable AI has in identifying implementable and trustworthy solutions. First hour of panel will be the individual presentations by the panelists and in the second hour a discussion with the audience.

SPECIAL SESSION: 8:30h – 10:30h

Title: Explainable Fuzzy AI Challenge (XFC 2022)

Organizers:

- Tim Arnett
- Javier Viana
- Lynn Pickering
- Brandon Kunkel

Description of the XFC: In this challenge, the teams have to create a fully autonomous eXplainable AI (XAI) XAI algorithm, in Python, that is able to play the Python Arcade Game "Asteroid Smasher". In the game, a 2-dimensional spacecraft moves to avoid collisions with numerous asteroids that appear. The asteroids have different shapes, sizes, and velocities. The spacecraft also has a weapon that can shoot straight ahead. If the projectiles emitted reach any of the target asteroids, they break into smaller pieces. The smallest asteroid pieces disappear after being hit by a projectile. A control system must consider all the different features of the system and determine the movement and shooting decisions of the spacecraft. This year, for the challenge, the control system must be able to control a game with a single vehicle or multiple vehicles.

Session Agenda:

- Introduction and highlight video – 20 minutes
- Announcing top Winners – 5 minutes
- 3 Presentations of 5 mins for each of the winners of the competition – 15 minutes
- Lessons Learned – 10 minutes
- The Next Landmark – XFC 2023 & roadmap – 10 minutes
- Discussion with the judges/sponsors, their thoughts, and comments – 30 minutes
- Open discussion and Q&A – 30 minutes