NAFIPS 2023 Conference Schedule

31st May – 2nd June 2023

Digital Futures, University of Cincinnati, Cincinnati Ohio, USA

Time Schedule	DAY 1 *31st May 2023, Wednesday*	DAY 2 *1st June 2023, Thursday*	DAY 3 *2nd June 2023, Friday*
08:00h - 10.30h	**REGISTRATION** **OPENING CEREMONY**	**Invited Panel on XAI & Human-AI Collaboration:** Moderator Nick Ernest	**Educational Session**
	Plenary Talk 1: Mr. Rob Richardson, Founder Web3 "Disruptive Forces, Responsible Actions: Harnessing AI's Potential for Good"	**Plenary Talk 3**: **Dr. Bernard De Baets, Ghent University, Belgium** "Readings from my monotone storybook"	**NAFIPS 2023 General Meeting**
10:30h - 10:45h	*Tea/ Coffee Break*	*Tea/ Coffee Break*	*Tea/ Coffee Break*
10:45h - 12:45h	**Parallel Technical Session 1:** Interval Uncertainty **Parallel Technical Session 2:** Aerospace Applications	**Parallel Technical Session 3:** Fuzzy Sets and Systems **Parallel Technical Session 4:** Engineering Applications	**NAFIPS 2022 Early Career Award Lecture:** Dr. Tiago Mendonça da Costa + Technical Talks
12:45h - 13:45h	*Lunch/* **NAFIPS Board Meeting**	*Lunch/* **NAFIPS Board Meeting**	*Lunch*
13:45h - 14:45h	**Plenary Talk 2: Dr. Isabelle Bloch, Sorbonne Université. Paris, France** "Fuzzy Sets: A Key Towards Hybrid Explainable Artificial Intelligence for Image Understanding"	**Technical Session 5:** Explainable AI	**Invited Panel on Trustworthy AI: Gaps and Challenges**: Moderator Kelly Cohen
15:05h - 15:20h	*Tea/ Coffee Break*	*Tea/ Coffee Break*	*Tea/ Coffee Break*
15:20h - 18:20h	**Thales Genetic Fuzzy Tree SDK Workshop for Transparent, Understandable and Ethical AI**	**Special Session:** Explainable Fuzzy AI Challenge (XFC 2023) **Tour of Digital Futures Facility**	*Note of Thanks & Adjourn*
18:30h onwards	***NAFIPS AWARDS CEREMONY & DINNER HOSTED BY THALES***	***Dining Out at the*** Hofbräuhaus Newport	

*** A Pre-Conference Workshop on "Constraint Programming and Decision Making CoProD'23" will be held on 30th May 2023, Tuesday from 2.00 pm – 6.00 pm. More details of the workshop can be found on conference website https://nafips2023.com/**

DAY 1 - 31st May 2023, Wednesday

Time Schedule	Location	Event	Activity
08:00h - 09:00h	DF 140	Registration Desk	Conference Kit Collection
09:00h - 09:30h	DF 140	Opening Ceremony	Introductions: **Kelly Cohen, Conference co-Chair** Welcome Address: **Pat Limbach, Vice President for Research, University of Cincinnati**
09:30h - 10:00h		Plenary Talk 1	Mr. Rob Richardson, Founder Web3 And Ecosystem builder "Disruptive Forces, Responsible Actions: Harnessing AI's Potential for Good"
10:00h - 10:30h			
10:30h - 10:45h	DF140	Tea/ Coffee Break	Beverages and snacks will be served
10:45h - 11:05h	DF 140	**Technical Session 1 (held in Parallel):** Interval Uncertainty **Session Chairs:** Martine Ceberio Vladik Kreinovich	**Paper #4635** Theoretical Explanation of Bernstein Polynomials' Efficiency *Vladik Kreinovich*
11:05h - 11:25h			**Paper #7236** Everything Is a Matter of Degree: The Main Idea Behind Fuzzy Logic Is Useful in Geosciences and in Authorship *Christian Servin, Aaron Velasco, *Edgar Daniel Rodriguez Velasquez, and Vladik Kreinovich*
11:25h - 11:45h			**Paper #9030** Causality: Hypergraphs, Matter of Degree, Foundations of Cosmology *Cliff Joslyn, Andres Ortiz-Munoz, *Edgar Daniel Rodriguez, Velasquez, Olga Kosheleva and Vladik Kreinovich*
11:45h - 12:05h			**Paper # 9675** Faster Algorithms for Estimating the Mean of a Quadratic Expression under Uncertainty *Martine Ceberio, Vladik Kreinovich, Olga Kosheleva and Lev Ginzburg*
12:05h - 12:25h			**Paper #2157** Data Driven Level Set Fuzzy Classification *Fernando Gomide and Ronald Yager*
12:25h - 12:45h			**Paper #8714** Complex-Valued Interval Computations Are NP-Hard Even for Single Use Expressions *Martine Ceberio, Vladik Kreinovich, Olga Kosheleva and Guenter Mayer*

10:45h - 11:05h	DF 145	**Technical Session 2 (held in Parallel):** Aerospace Applications **Session Chair:** Anoop Sathyan	**Paper #2639** Fuzzy Logic-aided Inverse Kinematics Control for Redundant Manipulators *Anirudh Chhabra, Sathya Karthikeyan, Daegyun Choi, and Donghoon Kim*
11:05h - 11:25h			**Paper #773** Air Traffic Control using Fuzzy Logic *David Mulligan and Kelly Cohen*
11:25h - 11:45h			**Paper #589** Fuzzy Inference System-based Collision Avoidance of Unmanned Aerial Vehicles Optimized using Genetic Algorithm *Shyam Rauniyar and Donghoon Kim*
11:45h - 12:05h			**Paper #7083** Genetic Fuzzy Passivity-Based Control Applied to a Robust Control Benchmark Problem *Jared Burton and Kelly Cohen*
12:05h - 12:25h			**Paper #4891** Optimization of Artificial Potential Field using Genetic Algorithm for Human-aware Navigation of Autonomous Mobile Robots *Shurendher Kumar Sampathkumar, Anirudh Chhabra, Daegyun Choi, and Donghoon Kim*
12:25h - 12:45h			**Paper #9872** Formal Descriptive Modeling for Self-Verification of Fuzzy Network Systems *Owen Macmann, Rick Graves, and Kelly Cohen*
12:45h - 13:45h	DF 140	Lunch	Boxed Lunch will be served. In parallel, NAFIPS board meeting (room 150 – Board members only)
13:45h - 14:45h	DF 140	Plenary Talk 2	Dr. Isabelle Bloch, Professor at Sorbonne Université. Paris, France "Fuzzy Sets: A Key Towards Hybrid Explainable Artificial Intelligence for Image Understanding"
15:05h - 15:20h	DF 140	Tea/ Coffee Break	Beverages and snacks will be served
15:20h - 18:20h	DF 140	Thales Workshop in TRUE AI	**Thales Genetic Fuzzy Tree SDK Workshop for Transparent, Understandable and Ethical AI** *Presented by Nick Ernest, Tim Arnett and Jorge Fernandes*
18:30h onwards	DF 140	Dinner & Awards Ceremony	NAFIPS Awards Ceremony, Best paper awards & Dinner Sponsored by Thales

DAY 1 - 31st May 2023, Wednesday (Continued)

DAY 2 – 1st June 2023, Thursday

Time Schedule	Location	Event	Activity
‘ 08:00h - 09:30h	DF 140	Invited Panel	Invited Panel on Explainable Ai and Human-AI Collaboration - moderated by Nick Ernest Confirmed Panelists: Tim Arnett (Thales), Jorge Hernandez (Thales), Steve Harbour (SWRI), Grant Schaffner (SES), Rick Graves (AFRL).
09:30h - 10:30h	DF 140	Plenary Talk 3	**Dr. Bernard De Baets, Ghent University, Belgium** “Readings from my monotone storybook”
10:30h - 10:45h	DF 140	Tea/ Coffee Break	Beverages and snacks will be served
10:45h - 11:05h	DF 140	Parallel Technical Session 3: Fuzzy Sets and Systems Session Chairs: Barnabas Bede and Scott Dick	**Paper #310** Accurate and explainable retinal disease recognition via DCNFIS *Mojtaba Yeganejou, Mohammad Keshmiri, and Scott Dick*
11:05h - 11:25h			**Paper # 6711** Associative Property of Interactive Addition for Intervals: Application in the Malthusian Model *Vinicius Wasques, Allan Andrade, and Pedro Zanineli*
11:25h - 11:45h			**Paper #2518** Equivalence Between 1-D Takagi-Sugeno Fuzzy Systems with Triangular Membership Functions and Neural Networks with ReLU Activation *Barnabas Bede, Vladik Kreinovich, and Peter Toth*
11:45h - 12:05h			**Paper #3516** Binary Constrained Interval Arithmetic *Flaulles Bergamaschi and Regivan Santiago*
12:05h - 12:25h			**Paper #4746** Deep learning ANFIS architectures *Ben van Oostendorp, Eric Zander, and Barnabas Bede*
12:25h - 12:45h			**Paper #3929** Calibration Error Estimation Using Fuzzy Binning *Geetanjali Bihani and Julia Taylor Rayz*
10:45h - 11:05h	DF 145	Parallel Technical Session 4 Fuzzy Sets & Systems	**Paper #8697** Review of a Fuzzy Logic based Airport Passenger Flow Prediction System *Javier Viana, Kelly Cohen, Stephen Saunders, Naashom Marx, Brian Cobb, Hannah Meredith, and Madison Bourbon*
11:05h - 11:25h			**Paper #4442** Developing System Requirements of Trustworthy AI Enabled Refueling Spacecraft *Elizabeth Rochford and Kelly Cohen*
			Paper #4895

11:25h - 11:45h		Session Chairs: Daegyun Choi & Alex Walker	Numerical Solutions of fuzzy population models: A case study for Chagas Disease *Beatriz Laiate, *Felipe Longo, *Jose Ronaldo Alves, and Joao Frederico C. A. Meyer*
11:45h - 12:05h			**Paper #4829** Growth Kinetics of Gold Nanoparticles via p-fuzzy systems *Vinicius Wasques, Valeria Marangoni, and Shaian Anghinoni*
12:05h - 12:25h			**Paper #3240** Interval Sequence: choosing a sequence of the investment *Marina Mizukoshi, Tiago Mendonca da Costa, Yurilev Chalco-Cano, and Weldon A. Lodwick*
12:25h - 12:45h			**Paper #3516** A Fuzzy Inference System for an Optimal Spacecraft Attitude Sate Trajectory *Alex Walker*
12:45h - 13:45h	DF 140	Lunch	Boxed Lunch will be served. In parallel, NAFIPS board meeting (room 150 – Board members only)
13:45h - 14:05h	DF 140	Technical Session 4: Explainable AI Session Chair: Tim Arnett	**Paper #7704** Comparison of Explanation Methods for Genetic Fuzzy Trees for Wine Quality Predictions *Timothy Arnett, Nicholas Ernest, and Zachariah Phillips*
14:05h - 14:25h			**Paper # 4660** Forcing the Network to use Human Explanations in its Inference Process *Javier Viana and Andrew Vanderburg*
14:25h - 14:45h			**Paper #3677** Genetic Fuzzy Threat Assessment for Asteroids 2600 Derived Game *Daniel Heitmeyer and Kelly Cohen*
14:45h - 15:05h			**Open Discussion led by Tim Arnett with Audience in Explainable AI**
15:05h - 15:20h	DF 140	Tea/ Coffee Break	Beverages and snacks will be served

DAY 2 – 1st June 2023, Thursday (Continued)

15:20h - 16:50h	DF 140	Invited Student Session Session Chair: Tim Arnett	**Title:** Explainable Fuzzy AI Challenge (XFC 2023) **Organizers: Tim Arnett, Javier Viana, Lynn Pickering, Sam King, Nick Ernest** ***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 ▪ Announcing top Winners ▪ Recorded Presentations of 5 mins for each of the winners of the competition ▪ Lessons Learned ▪ The Next Landmark – XFC 2024 & roadmap ▪ Discussion with the judges/sponsors, their thoughts, and comments ▪ Open discussion and Q&A
16:50h- 18:00h	Start at DF 140		Tour of Digital Futures Facility
19:00h onwards	Hofbräuhaus Newport!	Conference Banquet	Conference Banquet at the Hofbräuhaus Newport https://www.hofbrauhausnewport.com/

DAY 2 – 1st June 2023, Thursday

DAY 3 – 2nd June 2023, Friday

Time Schedule	Location	Event	Activity
08:00h - 09:00h	DF140	**Educational Talk + Open Discussion on Education**	**Paper #6340** Fuzzy Logic++: Towards Developing Fuzzy Education Curricula Using ACM/IEEE/AAAI CS2023 *Christian Servin, Eric Eaton, Amruth Kumar, and Brett A. Becker*
09:00h - 10:30h		**NAFIPS General Meeting**	NAFIPS 2023 – General Meeting, NAFIPS President Barnabas Bede **Invited**
10:30h - 10:45h	DF 140	Tea/ Coffee Break	Beverages and snacks will be served in the Lounge
10:45h - 12:45h	DF 140	**NAFIPS 2022 Early Career Award Lecture +_** **Technical Talks**	**Lecture by the Early Career Award awardee Dr. Tiago Mendonça da Costa** **Paper #3516** Binary Constrained Interval Arithmetic *Flaulles Bergamaschi and Regivan Santiago*
12:45h - 13:45h	DF 140	Lunch	Boxed Lunch will be served.
13:45h-15:45h	DF 140	**Invited Panel**	**Invited Panel on Trustworthy AI: Gaps and Challenges** **Moderator:** Kelly Cohen **Confirmed Panelists:** Jorge Hernandez Thales; Prof. Vladik Kreinovich, Computer Science, UT El Paso, TX; Prof. Bernard De Baets, Ghent University, Belgium; Julia Rayz, Computer and Information Technology, Purdue University, Justin Zhan, Computer Science, UC/C; David Fleck, UC/College of Medicine
15:45h-16:00h	DF 140	**CLOSING CEREMONY**	Note of Thanks

Thales TRUE AI Workshop
May 31st
3-6 PM

Digital Futures
Room 140

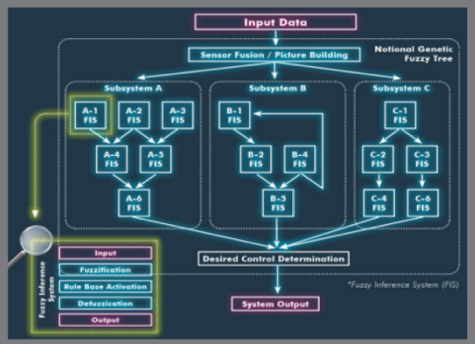
thalesgroup.com

THALES
Building a future we can all trust

Thales Genetic Fuzzy Tree SDK Workshop
For Transparent, Understandable and Ethical AI

Genetic Fuzzy Trees and Formal Verification

- Introductory and advanced topics in genetic optimization of Fuzzy Trees
- Formal Verification introduction and examples
- Overview of Thales GFT SDK
- GFT AI Software Certification discussion



Thales GFT SDK Demonstrations

- OpenAI Gym example problems
- Modified classic Atari game «Asteroids» utilized within NAFIPS annual eXplainable Fuzzy Challenge (XFC)

DIGITAL FUTURES BUILDING

LAB NAVIGATION

LEVEL 1 (NAFIPS 2023 Conference held in Room 140 with breakout rooms 145 and 150)