SCAN 2025 – 20th International Symposium on Scientific Computing, Computer Arithmetic, and Verified Numerical Computations

September 22-26, 2025

Carl von Ossietzky Universität Oldenburg

Monday, September 22

CoProD: 17th International Workshop on Constraint Programming and Decision Making – Library Auditorium

8:30-8:35	Opening	
8:35-9:00	Luc Jaulin	Optimal separator for an hyperbola; Application to localization
9:00-9:25	Milan Hladík	Robustness Properties of Absolute Value Linear Programming Problems and Relations to Interval Analysis
9:25:9:50	Ana Tapia-Rosero, Olga Kosheleva, and Vladik Kreinovich	What is the most natural way to propagate subjective interval uncertainty -- and why
9:50-10:15	Niklas Winnewisser, Michael Beer, Olga Kosheleva, and Vladik Kreinovich	How to combine subjective intervals: a natural idea
10:15-10:40	Niklas Winnewisser, Michael Beer, Victor Timchenko, Yuriy Kondratenko, Olga Kosheleva, and Vladik Kreinovich	Why midpoint, why radius (half-width): invariance-based numerical characteristics of an interval and how they are related to color vision and color optical computing
10:40-11:05	Ildar Z. Batyrshin, Luis A. Villa-Vargas, Nailya I. Kubysheva, Olga Kosheleva, Muhammad Ahmad, and Imre J. Rudas	Complex Chemical and Biochemical Reactions: Maybe Fuzzy Techniques Can Help
11:05-11:30	Martine Ceberio, Olga Kosheleva, and Vladik Kreinovich	Why topology helps to detect cyber-intrusions
11:30-11:55	Jean Rendon, Clariandys Rivera, Afshin Gholamy, and Leobardo Valera	Pre-Hashing as a Cryptographic Tool for Securing Entrepreneurial Ideas
11:55-12:20	Andrea Luces, Jean Rendon, Afshin Gholamy, and Leobardo Valera	Predicting Subsurface Soil Parameters Using Surface and Satellite Data with Machine Learning Techniques

Monday, September 22

SCAN 2025: Library Auditorium

14:00-14:30	Opening (Ekaterina Auer, Marit Lahme, Astrid Nieße, Andreas Rauh)	

Moore Prize Lecture (Chair: Vladik Kreinovich)

14:30-16:00	Tristan Buckmaster, Gonzalo Cao-Labora, Javier Gomez-Serrano	Smooth imploding solutions for 3D compressible fluids

Regular Session: Special Functions (Chair: Luc Jaulin)

16:30-17:00	Hiroaki Miyauchi, Taisei Asai, Masahide Kashiwagi and Akitoshi Takayasu	Constructing the Bessel function rigorously via the power series arithmetic
17:00-17:30	Lucas Si Larbi, Eric Lucet and Julien Alexandre Dit Sandretto	Interval Uniform, Non-Uniform, Rational, Non-Rational B-spline Curves

PhD Poster Session

Tuesday, September 23

SCAN 2025: Library Auditorium

Plenary Lecture (Chair: Ekaterina Auer)

9:00-10:30	Siegfried Rump	Verified error bounds for sparse systems

Regular Session A: Formal Verification (Chair: Takeshi Ogita)

11:00-11:30	Antoine Besset, Joris Tillet and Julien Alexandre Dit Sandretto	Formal Verification of State and Temporal Properties of Neural Network-Controlled Systems
11:30-12:00	Martin Fränzle, Paul Kröger and Anna Nienaber	Exploiting the Impossible: Towards Resilience of Decision Making Against Misperceptions
12:00-12:30	Ryoki Endo and Xuefeng Liu	Computer-assisted proof of the simplicity of the second Dirichlet eigenvalue for non-equilateral triangles

Tuesday, September 23

SCAN 2025: A01-0-006

Regular Session B: Tools and Implementations (Chair: Simon Rohou)

11:00-11:30	Ryoga Iwanami	Verry: an open-source package for verified computation written in Python 3
11:30-12:00	Pierre Filiol, Luc Jaulin, Theotime Bollengier and Jean-Christophe LeLann	Hardware accelerated interval arithmetic for mobile robotics using RISC-V ISA extension
12:00-12:30	Jiří Khun and Jan Schmidt	Towards Interval Arithmetic in TensorFlow: A Comparison of Approaches

Wednesday, September 24

SCAN 2025: Library Auditorium

Plenary Lecture (Chair: Nathalie Revol)

9:00-10:30	Andreas Rauh	Interval and Set-Based Approaches for Control and State Estimation: Their Use for Offline and Online Purposes

Regular Session A: PDEs (Chair: Anna Gierzkiewicz)

11:00-11:30	Kazuaki Tanaka, Ryoga Iwanami, Kaname Matsue and Hiroyuki Ochiai	Green-Representable Solutions: Reformulating Sub- and Super-solution Theory for Poisson's Equation
11:30-12:00	Taisei Asai, Kazuaki Tanaka, Satoshi Tanaka and Shin'Ichi Oishi	Verified Computation of All Positive Solutions to a Hénon-Type Boundary Value Problem
12:00-12:30	Akitoshi Takayasu and Jean-Philippe Lessard	Semigroup approach for validating solutions to semilinear parabolic PDEs

Wednesday, September 24

SCAN 2025: A01-0-006

Regular Session B: Uncertainty Quantification (Chair: Luc Jaulin)

11:00-11:30	Olga Kosheleva and Vladik Kreinovich	For statistical analysis of big data, interval uncertainty is needed
11:30-12:00	Jahangir Alam, Ismail Hossain, Tausif Hossain, Md Nuruzzaman Sojib, Olga Kosheleva and Vladik Kreinovich	How to compare situations in which we measure different quantities with different uncertainty
12:00-12:30	Ekaterina Auer and Wolfram Luther	Towards Fair and Explainable Medical Risk Prediction Software via Dempster-Shafer Theory

Department of Computer Science

QR code and link to the detailed conference program

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Thursday, September 25

SCAN 2025: Library Auditorium

Plenary Lecture (Chair: Andreas Rauh)

9:00-10:30	Tino Teige	Bringing Formal Methods from Academia to Real-World Applications in Industry: My Personal Two-Decades-Journey

Regular Session A: Estimation (Chair: Bernd Tibken)

11:00-11:30	Quentin Brateau, Fabrice Le Bars and Luc Jaulin	Separator for the remoteness constraint
11:30-12:00	Damien Esnault, Simon Rohou, Fabrice Le Bars and Luc Jaulin	Computing Interval Detection-Probability Grids via Monte-Carlo method for Underwater Robotics
12:00-12:30	Marit Lahme and Andreas Rauh	Set-Based Identification of Characteristic Curves and Its Challenges for Real-Life Applications

Regular Session A: Linear Systems and Linear Algebra: Library Auditorium (Chair: Siegfried Rump)

14:30-15:00	Haruto Kijima and Takeshi Ogita	Fast Implementation of Interval Matrix Multiplication Using Infimum-Supremum Representation With SIMD Operations
15:00-15:30	Takeshi Terao, Yoshitaka Watanabe and Katsuhisa Ozaki	Verification of Singular Values under Oblique Inner Product Space for Matrices
15:30-16:00	Katsuhisa Ozaki and Toru Koizumi	Tight Enclosure of Matrix Multiplication using Fused Multiply-Add

Regular Session A: Neural Networks: Library Auditorium (Chair: Vladik Kreinovich)

16:30-17:00	Attila Szász and Balázs Bánhelyi	Parameter Robustness of Neural Networks
17:00-17:30	Tibor Csendes	Interval Based Verification of Adversarial Example Free Zones for Neural Networks

Thursday, September 25

SCAN 2025: A01-0-006

Regular Session B: Uncertainty Quantification (Chair: Tibor Csendes)

11:00-11:30	Olga Kosheleva and Vladik Kreinovich	Inconsistencies in Fuzzy Estimations: Kaucher Arithmetic Naturally Appears
11:30-12:00	Miroslav Svitek, Olga Kosheleva and Vladik Kreinovich	Shapley Value Under Interval Uncertainty Revisited: Why Seemingly Natural Axiomatic Approach Is Not Fully Adequate
12:00-12:30	Luc Jaulin	A new wrapper for a reliable resolution of underdetermined nonlinear equations

Regular Session B: Optimization (Chair: Julien Alexandre Dit Sandretto)

14:30-15:00	Milan Hladík	Linear Programming Problems with Absolute Values and Interval Uncertainty
15:00-15:30	Cyril Kotecký and Milan Hladík	Complementary stability in quadratic interval programming
15:30-16:00	Christophe Jermann, Nathalie Revol and Christine Solnon	B&P algorithms for continuous constraint problems: a survey of branching strategies

Regular Session B: Dynamic Systems (Chair: Simon Rohou)

16:30-17:00	Ramiz Dilji, Bernd Tibken, Robert Dehnert, Youping Fan, Regina Deisling and Laura Ackerschott	Estimation of the Domain of Attraction for Nonlinear Systems using the Bihari Inequality
17:00-17:30	Andreas Rauh and Marit Lahme	Observer-Based Approaches for a Verified Simulation and Pseudo State Estimation of Fractional Dynamic Systems

Friday, September 26

SCAN 2025: Library Auditorium

Plenary Lecture (Chair: Andreas Rauh)

9:00-10:30	Christoph Matheja	Automated Verification of Discrete Probabilistic Programs

Regular Session A: Dynamic Systems (Chair: Robert Dehnert)

11:00-11:30	Robert Szczelina, Anna Gierzkiewicz and Jakub Kural	Investigating chaos in Delay Differential Equations with rigorous numerical methods
11:30-12:00	Jakub Kural, Anna Gierzkiewicz and Robert Szczelina	Computer assisted proof of existence of periodic solutions to ENSO delay differential equation model
12:00-12:30	Théo Le Terrier, Marie Babel and Vincent Drevelle	Ultra-wideband Based Smart Wheelchair Pose Estimation using Interval Analysis

Regular Session A: Dynamic Systems (Chair: Marit Lahme)

14:00-14:30	Andreas Rauh and Friederike Bruns	Set-Based Contracts for Systematic Controller Tuning in Interconnected Dynamic Systems
14:30-15:00	Anna Gierzkiewicz, Maciej Capinski and Pau Martin	Oscillating orbits in the Sitnikov model: equal masses case
15:00-15:30	Mohamed Fnadi and Régis Lherbier	Interval Particle Filter for LiDAR-Based Object Tracking
16:00	**Closing of SCAN 2025**	

Friday, September 26

SCAN 2025: A01-0-006

Regular Session B: Optimization (Chair: Ekaterina Auer)

11:00-11:30	Mihály Gencsi and Boglárka G.-Tóth	Improvements of the Geometrical Test in Interval Branch and Bound methods
11:30-12:00	Verlein Radwan, Simon Rohou and Gilles Trombettoni	Exhaustive Interval-based 2-D Shape Registration Under Similarity Transformation
12:00-12:30	Maël Godard, Luc Jaulin and Damien Massé	Adaptative parallelepipedic approximation of the image of a set by a nonlinear function

Regular Session B: Optimization (Chair: Nathalie Revol)

14:00-14:30	Yuki Uchino, Katsuhisa Ozaki and Toshiyuki Imamura	High-Performance Emulation of Matrix Multiplication using INT8 Matrix Engines and its Error Analysis
14:30-15:00	Lorenz Gillner and Ekaterina Auer	Efficient Acceleration Strategies for Interval Branch-and-Bound Type Methods
15:00-15:30	Diego Romano, Ekaterina Auer, Francesco Gregoretti and Lorenz Gillner	GPU-Accelerated Algorithmic Differentiation For Reliable Computing: Comparing Different Architectures

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