

LICS 2023 and Affiliated Workshops Program

Combinatorial Games in Finite Model Theory, 2023

Saturday June 24 – Room CAS B20 - 685
Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

**9:30-10:30 Invited Speaker: [One Two Three ...](#)
[Ehrenfeucht: Descriptive Complexity and Games](#)
Neil Immerman**

10:30- 11:00 Coffee break

11:00-12:15

- [Combinatorial Games for Quantifier Number](#) , *Rik Sengupta*
- [From Quantifier Depth to Quantifier Number: Separating Structures in Finite Variable Logic](#), *Harry Vinall-Smeeth and Christoph Berkholz*

12:30- 14:30 Lunch

14:30-15:30 Invited Speaker: [TBA](#), Antonina Kolokolova

15:30- 16:00 Coffee break

16:00-17:15

- [Quantifiers Closed Under Partial Polymorphisms](#), *Anuj Dawar and Lauri Hella*

- [Flipper Games for Monadically Stable Graph Classes](#), *Wojciech Przybyszewski*

Sunday June 25 – Room CAS B20 - 685
Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:30-10:30 Invited Speaker: [On Limitations of the Ehrenfeucht-Fraïssé-method in Descriptive Complexity](#), Yijia Chen

10:30- 11:00 Coffee break

11:00-12:15

- [Second-Order Quantifiers with Poly-Logarithmic Bounds](#), *Shiguang Feng, Kexu Wang, and Xishun Zhao*
- [Indistinguishability games for Extensions of PDL with Intersection and Converse](#), *Diego Figueira, Santiago Figueira, and Edwin Pin*

12:30- 14:30 Lunch

14:30-15:30 Invited Speaker: [Ehrenfeucht-Fraïssé Games for Semiring Semantics](#), Erich Grädel

15:30- 16:00 Coffee break

16:00-17:15 - Open Problems Session

The Decision Problem in First-Order Logic (DPFO2023)

Saturday June 24 – Room CAS B18 - 685
Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:00- 9:30 Opening Remarks

**9:30-10:30 Invited Speaker: *The Classical Decision Problem: From Hilbert's Programme to Modern Perspectives*,
Erich Grädel**

10:30- 11:00 Coffee break

**11:00-12:00 Invited Speaker: *Towards intended models: accounting for minimized and fixed predicates in Description Logics*,
Magdalena Ortiz**

12:00-12:30

• *Decidability of the Relational Syllogistic with Reordered Predicates*,
Hongkai Yin

12:30- 14:00 Lunch

**14:00-15:00 Invited Speaker: *Conservative Extensions in Decidable Fragments of First-Order Logic*,
Jean Christoph Jung**

15:00-15:30

- *A Proof-Theoretic Decision Procedure for Intuitionistic S4* , Marianna Girlando, Roman Kuznets, Sonia Marin, Marianela Morales and Lutz Straßburger

15:30- 16:00 Coffee break

16:00-17:00 Invited Speaker: *New directions and new connections for two variable logic*, Michael Benedikt

Sunday June 25 – Room CAS B18 - 685
Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:00-10:00 Invited Speaker: *Two-variable first-order logic on ordered structures*, Thomas Zeume

10:00-10:30

- *Saturation-Based Querying Procedures for the Clique-Guarded Negation Fragment*, Sen Zheng and Renate A. Schmidt

10:30- 11:00 Coffee break

11:00-12:30

- *On the satisfiability problem for multi-sorted quantified set-theoretic fragments*, Domenico Cantone and Marianna Nicolosi-Asmundo
- *Essentially undecidable weak set theories*, Domenico Cantone, Eugenio Omodeo and Mattia Panettiere
- *Decidability and Nonassociativity*, Eben Blaisdell

12:30- 14:00 Lunch

14:00-15:00 Invited Speaker: *Graph queries and description logics: from unrestricted to finite models*, Filip Murlak

15:00-15:30

- *Craig Interpolation for Guarded Fragments*, Jesse Comer and Balder ten Cate

15:30 - Coffee break and closing remarks

Quantitative Logical Methods (Qualog 2023)

Sunday June 25 – Room CAS B36 - 685

Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:00-10:00 Invited Speaker: *Two real-valued propositional logics*, Gordon Plotkin

10:00-10:30

- *Varieties of Quantitative Algebras: A Categorical Perspective*, Henning Urbat

10:30- 11:00 Coffee break

11:00-12:30

- *Monoidal Width*, Elena Di Lavore
- *An AAK theory approach to the approximate minimization problem*, Clara Lacroce
- *A Taylor Series Metric for Cartesian Differential Categories*, Jean-Simon Pacaud Lemay

12:30- 14:00 Lunch

14:00-15:00 Invited Speaker: *The forgotten logics behind the bisimulation metric for Labelled Markov Processes*, Josée Desharnais

15:00-15:30

- *Extending bisimulation to continuous-time systems: from qualitative to quantitative approaches*, Florence Clerc

15:30 – 16:00 - Coffee break

16:00-17:00

- *Sensitivity for Vector Metrics*, June Wunder
- *Model Checking Probabilistic Visibly Pushdown Automata*, Tobias Winkler

Structure meets Power

Sunday June 25 – Room CAS B12 - 685
Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:20- 9:25 Opening Remarks

9:25-10:10 Invited Speaker: *The Algebra of Finite Categories*, Howard Straubing

10:10-10:30

- *Categorical Structure in Theory of Arithmetic*, Lingyuan Ye

10:30- 11:00 Coffee break

11:00-12:20

- *Compositional Algorithms on Compositional Data: Deciding Sheaves on Presheaves*, Benjamin Merlin Bumpus
- *Algebras for Automatic Relations*, Rémi Morvan
- *GADTs Are Not (Even Lax) Functors*, Pierre Cagne
- *Capturing Quantum Isomorphism in the Kleisli Category of the Quantum Monad*, Amin Karamlou

12:30- 14:00 Lunch

14:00-14:45 Invited Speaker: *Guarded KATs – efficient reasoning for algebraic program verification*, Alexandra Silva

14:45-15:25

- *The Category of MSO Transductions*, Mikołaj Bojańczyk
- *Concurrent Games over Relational Structures*, Glynn Winskel

15:30 – 16:00 - Coffee break

16:00-17:00

- *Enumerating Error Bounded Polytime Algorithms Through Arithmetical Theories*, Ugo Dal Lago
- *Higher-Dimensional Subdiagram Matching*, Diana Kessler
- *Finitely Accessibly Arboreal Adjunctions and Hintikka Formulae*, Colin Riba
- *Profinite λ -terms and Parametricity*, Vincent Moreau
- *On Conway's Proof of Undecidability in Elementary Arithmetic*, Peter Hines

Logic Mentoring Workshop

Sunday June 25 – Room CAS 224 - 685

Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:00- 9:30 Meet and greet

9:30-10:30

- *PROcrastination is not for amateurs*, Sonia Marin
- *What makes theoretical research interesting–relevant–exciting?*, Martin Grohe

10:30- 11:00 Coffee break

11:00-12:30

- *TBA*, Antonina Kolokolova
- *Nobody knows anything*, Mikołaj Bojańczyk
- *Fighting for tenure*, Anupam Das

12:30- 14:00 Lunch

14:30-15:30

- *The Grant Application Survival Guide*, Marianna Girlando
- *What I am bad at, or some reflections for myself*, Igor Walukiewicz
- *What I learned through my PhD journey to industry*, Alëna Rodionova

15:30 – 16:00 - Coffee break

16:00-17:00 Panel: *Anuj Dawar, Alëna Rodionova, Igor Walukiewicz, and Matthew Weaver*

LICS 2023

Monday June 26 – Room STO50 - 675
Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:00-10:30 Tutorial: [Logic for Explainable AI](#), Adnan Darwiche

10:30- 11:00 Coffee break

11:00-12:30 Finite model theory

- [The Descriptive Complexity of Graph Neural Networks](#), *Martin Grohe*
(Distinguished Paper)
- [The Iteration Number of the Weisfeiler-Leman Algorithm](#), *Martin Grohe, Moritz Lichter and Daniel Neuen*
- [Simulating Logspace-Recursion with Logarithmic Quantifier Depth](#), *Steffen van Bergerem, Martin Grohe, Sandra Kiefer and Luca Oeljeklaus*
- [Embedded Finite Models beyond Restricted Quantifier Collapse](#), *Michael Benedikt and Ehud Hrushovski*
- [Distal combinatorial tools for graphs of bounded twin-width](#), *Wojciech Przybyszewski*
- [A categorical account of composition methods in logic](#), *Dan Marsden, Tomáš Jakl and Nihil Shah*

12:30- 14:00 Lunch

14:00-15:30 Logics and verification

- [The Logic of Prefixes and Suffixes is Elementary under Homogeneity](#), *Dario Della Monica, Angelo Montanari, Gabriele Puppis and Pietro Sala*
- [Revisiting Membership Problems in Subclasses of Rational Relations](#), *Pascal Bergsträßer and Moses Ganardi*
- [PDL on Steroids](#), *Diego Figueira, Santiago Figueira and Edwin Pin Baque*
- [Verifying linear temporal specifications of constant-rate multi-mode systems](#), *Michael Blondin, Philip Offtermatt and Alex Sansfaçon-Buchanan*
- [Minimization of Dynamical Systems over Monoids](#), *Georgios Argyris, Alberto Lluch Lafuente, Alexander Leguizamon Robayo, Mirco Tribastone, Max Tschaikowski and Andrea Vandin*
- [A Higher-Order Indistinguishability Logic for Cryptographic Reasoning](#), *David Baelde, Adrien Koutsos and Joseph Lallemand*

15:30- 16:00 Coffee break

16:00- 17:00 Semantic games and bicategories

- [Making Concurrency Functional](#), *Glynn Winskel*
- [From Thin Concurrent Games to Generalized Species of Structures](#), *Pierre Clairambault, Federico Olimpieri and Hugo Paquet*
- [The Cartesian Closed Bicategory of Thin Spans of Groupoids](#), *Pierre Clairambault and Simon Forest*
- [Fixpoint operators for 2-categorical structures](#), *Zeinab Galal*

17:15- 18:00 Semantics

- [A metalanguage for cost-aware denotational semantics](#), *Yue Niu and Robert Harper*
- [Deterministic stream-sampling for probabilistic programming: semantics and verification](#), *Fredrik Dahlqvist, Alexandra Silva and William Smith*
- [Automatic Amortized Resource Analysis with Regular Recursive Types](#), *Jessie Groesen, David M. Kahn and Jan Hoffmann*

18:30 Reception and distinguished papers announcements

Tuesday June 27 – Room STO50 - 675 Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:00- 10:30 MSO, transducers, automata

- [Folding interpretations](#), *Mikołaj Bojańczyk*
- [On the growth rates of polyregular functions](#), *Mikołaj Bojańczyk*
- [Z-polyregular functions](#), *Gaëtan Douéneau-Tabot, Aliaume Lopez and Thomas Colcombet*
- [Quantifying over Trees in Monadic Second-Order Logic](#), *Massimo Benerecetti, Bozzelli Laura, Fabio Mogavero and Adriano Peron*
- [Expressive Completeness of Two-Variable First-Order Logic with Counting for First-Order Queries on Unranked Trees](#), *Jelle Hellings, Marc Gyssens, Jan Van den Bussche and Dirk Van Gucht*
- [Group separation strikes back](#), *Thomas Place and Marc Zeitoun*

10:30- 11:00 Coffee break

11:00- 12:30 Proof systems, modal logic

- [Intuitionistic S4 is decidable](#), *Marianna Girlando, Roman Kuznets, Sonia Marin, Marianela Morales Elena and Lutz Straßburger*
- [Cut-restriction: from cuts to analytic cuts](#), *Agata Ciabattoni, Timo Lang and Revantha Ramanayake*
- [Existential Calculi of Relations with Transitive Closure: Complexity and Edge Saturations](#), *Yoshiki Nakamura*
- [Simplicial Set Models for Distributed Knowledge](#), *Éric Goubault, Roman Kniazev, Jérémy Ledent and Sergio Rajsbaum*
- [Fixed Point Logics on Hemimetric Spaces](#), *David Fernández-Duque and Quentin Gougeon*
- [Computational expressivity of \(circular\) proofs with fixed points](#), *Gianluca Curzi and Anupam Das*

12:30- 14:00 Lunch

14:00- 15:30 Tutorial: [Commutativity in Automated Program Verification](#), Azadeh Farzan

15:30- 16:00 Coffee break

16:00- 17:00 Stochastic systems

- [The Probabilistic Rabin Tree Theorem](#), *Damian Niwinski, Paweł Parys and Michał Skrzypczak*
- [Stopping Criteria for Value Iteration on Stochastic Games with Quantitative Objectives](#), *Jan Kretinsky, Tobias Meggendorfer and Maximilian Weininger*
- [Stochastic Best-Effort Strategies for Borel Goals](#), *Benjamin Aminof, Giuseppe De Giacomo, Sasha Rubin and Florian Zuleger*
- [On Certificates, Expected Runtimes, and Termination in Probabilistic Pushdown Automata](#), *Tobias Winkler and Joost-Pieter Katoen*

17:15- 18:15 Randomness

- [Pseudorandom Finite Models](#), *Jan Dreier and Jamie Tucker-Foltz*
- [On Exact Sampling in the Two-Variable Fragment of First-Order Logic](#), *Yuanhong Wang, Juhua Pu, Yuyi Wang and Ondrej Kuzelka*
- [\$\omega\$ PAP Spaces: Reasoning Denotationally About Higher-Order, Recursive Probabilistic and Differentiable Programs](#), *Mathieu Huot, Alexander K. Lew, Vikash K. Mansinghka and Sam Staton* (*Distinguished Paper*)
- [Evidential Decision Theory via Partial Markov Categories](#), *Elena Di Lavore and Mario Román*

**Wednesday June 28 – Room ST050 - 675
Commonwealth Ave, Boston, MA 02215**

8:15- 9:00 Breakfast

9:00-10:00 Invited talk: [A Survey of Algebraic Proof Complexity: Theory and Applications](#), Toniann Pitassi

10:00- 10:30 Coffee break

10:30- 12:00 Decidability and complexity

- The Identity Problem in the special affine group of \mathbb{Z}^2 , Ruiwen Dong (*Kleene Award Paper*)
- Orbit-finite linear programming, Arka Ghosh, Piotr Hofman and Sławomir Lasota (*Distinguished Paper*)
- Reachability in Injective Piecewise Affine Maps, Faraz Ghahremani, Edon Kelmendi and Joel Ouaknine
- Multiplicity Problems on Algebraic Series and Context-Free Grammars, Nikhil Balaji, Lorenzo Clemente, Klara Nosan, Mahsa Shirmohammadi and James Worrell
- Structure-Aware Lower Bounds and Broadening the Horizon of Tractability for QBF, Johannes K. Fichte, Robert Ganian, Markus Hecher, Friedrich Slivovsky and Sebastian Ordyniak
- The Power of Positivity, Toghrul Karimov, Edon Kelmendi, Joris Nieuwveld, Joël Ouaknine and James Worrell

12:00- 14:00 Lunch

14:00- 15:00 Invited talk: Applications of Information Inequalities to Database Theory Problems, Dan Suciu

15:00- 15:30 Coffee break

15:30- 16:30 Weighted automata, CSP

- The Big-O Problem for Max-Plus Automata is Decidable (PSPACE-Complete), Laure Daviaud and David Purser
- Computing the linear hull: Deciding Sequential? and Unambiguous? for weighted automata over fields, Jason Bell and Daniel Smertnig
- Boolean symmetric vs. functional PCSP dichotomy, Tamio-Vesa Nakajima and Stanislav Živný
- Symmetries of graphs and structures that fail to interpret a finite thing, Libor Barto, Bertalan Bodor, Marcin Kozik, Antoine Mottet and Michael Pinsker (*Distinguished Paper*)

16:45- 18:15 Poster session

19:00 Banquet

Thursday June 29 – Room ST050 - 675
Commonwealth Ave, Boston, MA 02215

8:15- 9:00 Breakfast

9:00- 10:00 Invited talk: [A system of inference based on proof search: an extended abstract](#), Dale Miller

10:00- 10:30 Test-of-Time awards

10:30- 11:00 Coffee break

11:00- 12:30 Semantics and rewriting

- [Operational Algorithmic Game Semantics](#), *Benedict Bunting and Andrzej Murawski*
- [Weak Similarity in Higher-Order Mathematical Operational Semantics](#), *Henning Urbat, Stelios Tsampas, Sergey Goncharov, Stefan Milius and Lutz Schröder*
- [Fully Abstract Normal Form Bisimulation for call-by-value PCF](#), *Nikos Tzevelekos, Vasileios Koutavas and Yu-Yang Lin (Distinguished Paper)*
- [Central Submonads and Notions of Computation: Soundness, Completeness and Internal Languages](#), *Titouan Carette, Louis Lomonnier and Vladimir Zamdzhiev*
- [Allegories of Symbolic Manipulation](#), *Francesco Gavazzo*
- [Higher-dimensional subdiagram matching](#), *Amar Hadzihasanovic and Diana Kessler*

12:30- 14:00 Lunch

14:00- 15:00 Linear logic, homotopy theory

- Taylor Expansion as a Monad in Models of DiLL, *Marie Kerjean and Jean-Simon Lemay*
- Cartesian Coherent Differential Categories, *Aymeric Walch and Thomas Ehrhard*
- Formalizing $\pi_4(S^3) \cong \mathbb{Z}/2\mathbb{Z}$ and Computing a Brunerie Number in Cubical Agda, *Axel Ljungström and Anders Mörtberg (Distinguished Paper)*
- Set-Theoretic and Type-Theoretic Ordinals Coincide, *Tom de Jong, Nicolai Kraus, Fredrik Nordvall Forsberg and Chuangjie Xu*

15:00- 15:30 Coffee break

15:30- 16:30 Pi-calculus and quantum circuits

- Extensional and Non-extensional Functions as Processes, *Ken Sakayori and Davide Sangiorgi (Distinguished Paper)*
- A Complete Equational Theory for Quantum Circuits, *Alexandre Clément, Nicolas Heurtel, Shane Mansfield, Simon Perdrix and Benoît Valiron*
- Completeness for arbitrary finite dimensions of ZXW-calculus, a unifying calculus, *Boldizsár Poór, Quanlong Wang, Razin Shaikh, Lia Yeh, Richie Yeung and Bob Coecke*
- Complete Graphical Language for Hermiticity-Preserving Superoperators, *Renaud Vilmart, Titouan Carette, Timothée Hoffreumon and Émile Larroque*