Ruiwen Dong

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Work experience

From 2023 **Postdoctoral Researcher**, *Saarland University*, Germany.
Department of Mathematics, project "Automata, Dynamics and Actions", with Laurent Bartholdi

Springs 2021 and 2020 **Research Intern**, *Laboratoire Informatique de l'Ecole Polytechnique*, France.
Research team MAX (Algebraic modeling and symbolic computation)

Summer 2019 **Mathematical Modelling Intern**, *Phimeca Engineering*, France.

Education

2021–2023 **DPhil, Computer Science**, *University of Oxford*, UK.
- Thesis title: *Algorithmic Problems for Subsemigroups of Infinite Groups*.
- Supervisors: Christoph Haase, James Worrell.

2020–2021 **MSc**, *Parisian Master of Research in Computer Science (MPRI), Université de Paris*, France.
- Master's thesis: *Computing Error Bounds for Asymptotic Expansions of Regular P-Recursive Sequences*.

2017–2021 ***Diplôme d'Ingénieur***, *Ecole Polytechnique*, France.
- Dissertation: *Computing input-output projections of dynamical models with applications to structural identifiability*.

2014–2018 **BSc, Mathematics**, *Peking University*, China.
- Bachelor's thesis: *The Tensor Product Canonical Form Calculation Optimized by Graph Isomorphism Algorithm*.

Awards and Honours

Kleene Award for the Best Student Paper, *LICS 2023*.

Best Student Paper Award (Track B), *ICALP 2023*.

Publications and Preprints

Preprints

Peer-reviewed articles

Ruiwen Dong. Semigroup algorithmic problems in metabelian groups. In *56th Annual ACM Symposium on Theory of Computing (STOC)*, 2024. To appear.

Ruiwen Dong. The Identity Problem in nilpotent groups of bounded class. In *35th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2024.

Ruiwen Dong, Stephen Melczer, and Marc Mezzarobba. Computing error bounds for asymptotic expansions of regular P-recursive sequences. *Mathematics of Computation*, 2024.

Ruiwen Dong. Recent advances in algorithmic problems for semigroups. *ACM SIGLOG News*, 2023.

Ruiwen Dong. Termination of linear loops under commutative updates. In *Proceedings of the 2023 International Symposium on Symbolic and Algebraic Computation (ISSAC)*, 2023.

Ruiwen Dong. The Identity Problem in $\mathbb{Z} \wr \mathbb{Z}$ Is Decidable. In *50th International Colloquium on*

Automata, Languages, and Programming (ICALP), 2023. Best Student Paper Award for Track B.

Ruiwen Dong. The Identity Problem in the special affine group of $\mathbb{Z}^2$. In *38th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS)*, 2023. Kleene Award for the Best Student Paper.

Ruiwen Dong, Christian Goodbrake, Heather A. Harrington, and Gleb Pogudin. Differential elimination for dynamical models via projections with applications to structural identifiability. *SIAM Journal on Applied Algebra and Geometry*, 2023.

Ruiwen Dong. Solving homogeneous linear equations over polynomial semirings. In *40th International Symposium on Theoretical Aspects of Computer Science (STACS)*, 2023.

Ruiwen Dong. Semigroup intersection problems in the Heisenberg Groups. In *40th International Symposium on Theoretical Aspects of Computer Science (STACS)*, 2023.

Ruiwen Dong. On the Identity Problem for unitriangular matrices of dimension four. In *47th International Symposium on Mathematical Foundations of Computer Science (MFCS)*, 2022.

Conference and seminar talks

• = conference contributions ○ = seminar and workshop talks

Decision problems in sub-semigroups of metabelian groups.
- ○ Séminaire "Groupes et Géométrie", University of Geneva, Switzerland — March 2024
- ○ Group theory seminar, Ecole Normale Supérieure, France — November 2023
- ○ AG1 Mittagsseminar, MPI for Informatics, Germany — June 2023
- ○ Logic Advanced Class, Mathematical Institute, University of Oxford, UK — May 2023

The Identity Problem in nilpotent groups of bounded class.
- • SODA 2024, Alexandria, USA — January 2024

Decidability problems in infinite semigroups.
- ○ Automata theory seminar, University of Warsaw, Poland — November 2023
- ○ Algorithmic Aspects of Dynamical Systems, Bellairs Research Institute, Barbados — May 2023

Termination of linear loops under commutative updates.
- • ISSAC 2023, Tromsø, Norway — July 2023

The Identity Problem in $\mathbb{Z} \wr \mathbb{Z}$ is decidable.
- • ICALP 2023, Paderborn, Germany — July 2023

The Identity Problem in the special affine group of $\mathbb{Z}^2$.
- • LICS 2023, Boston, USA — June 2023

Semigroup intersection problems in the Heisenberg Groups.
- • STACS 2023, Hamburg, Germany — March 2023

Solving homogeneous linear equations over polynomial semirings.
- • STACS 2023, Hamburg, Germany — March 2023

On the Identity Problem for unipotent matrix groups of nilpotency class at most ten.
- ○ Verification series seminar, University of Liverpool, UK — May 2022

On the Identity Problem for unitriangular matrices of dimension four.
- ○ RP 2022, MPI-SWS Kaiserslautern, Germany — October 2022
- ○ OFCOURSE series, MPI-SWS Kaiserslautern, Germany — October 2022
- • MFCS 2022, Vienna, Austria — August 2022
- ○ IRIF verification seminar, Paris, France — March 2022

A new algorithm for finding the input-output equations of differential models.
- ○ MAX team seminar, Ecole Polytechnique, France — October 2020

Reviewing work

ICALP, SODA, LICS, STACS, Information and Computation

Languages

Chinese	Native, C2	English	Fluent, C2
French	Fluent, C2	Russian	Proficient, C1
Polish	Proficient, C1	Turkish	Intermediate, B2

Programming languages and software

Python, Julia, C, C++, Java, R, Sage