Ruiwen Dong

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Education

2021–2023 **DPhil (PhD), Computer Science**, *University of Oxford*, UK.
- Research 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 Standard Type 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

Ruiwen Dong. Semigroup algorithmic problems in metabelian groups. 2023. `https://arxiv.org/abs/2304.12893`.

Ruiwen Dong. The Identity Problem in nilpotent groups of bounded class. 2023. `https://arxiv.org/abs/2208.02164`.

Peer-reviewed articles

Ruiwen Dong. Recent advances in algorithmic problems for semigroups. 2023. To appear in ACM SIGLOG News.

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

Work experience

March 2021, 6 months — **Research Internship**, *Laboratoire Informatique de l'Ecole Polytechnique*, France.
Asymptotic expansions of P-Recursive sequences. Supervisors: Stephen Melczer, Marc Mezzarobba.

March 2020, 6 months — **Research Internship**, *Laboratoire Informatique de l'Ecole Polytechnique*, France.
Differential algebra and applications to structural identifiability. Supervisors: Gleb Pogudin, Heather Harrington. Laureate for *Prix du centre de recherche*.

June 2019, 3 months — **Industrial Internship**, *Phimeca Engineering*, France.
Application of statistical learning in simulations of atmospheric dispersion of pollutants.

Conference talks

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

July 2023 — **ICALP 2023**, *Paderborn*, Germany.
The Identity Problem in $\mathbb{Z} \wr \mathbb{Z}$ Is Decidable

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

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

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

October 2022 — **RP 2022**, *MPI-SWS Kaiserslautern*, Germany.
On the Identity Problem for unitriangular matrices of dimension four

August 2022 — **MFCS 2022**, *Vienna*, Austria.
On the Identity Problem for unitriangular matrices of dimension four

Seminar and workshop talks

June 2023 — **AG1 Mittagsseminar**, *Max Planck Institute for Informatics*, Saarbrücken, Germany.
Decision problems in sub-semigroups of metabelian groups

May 2023 — **Logic Advanced Class**, *Mathematical Institute, University of Oxford*, UK.
Decision problems in sub-semigroups of metabelian groups

May 2023 — **Algorithmic Aspects of Dynamical Systems**, *Bellairs Research Institute*, Barbados.
Decidability problems in infinite semigroups

October 2022 — **OFCOURSE series**, *MPI-SWS Kaiserslautern*, Germany.
The Identity Problem for unitriangular matrices of dimension four

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

March 2022 — **IRIF verification seminar**, *IRIF*, France.
The Identity Problem for unitriangular matrices of dimension four

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

Reviewing work

ICALP 2022, SODA 2022, LICS 2023, Information and Computation

Languages

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

Programming languages and software

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