

Work experience

- 2024–present **Fellow by Examination (JRF)**, Magdalen College, University of Oxford, UK.
Subject: Computer Science
- 2023–2024 **Postdoctoral Researcher**, Saarland University, Germany.
Department of Mathematics, advisor: Laurent Bartholdi
- 2021/2020 **Research Intern**, Laboratoire Informatique de l'Ecole Polytechnique, France.
- Summer 2019 **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.
- 2017–2021 **Diplôme d'Ingénieur**, Ecole Polytechnique, France.
- 2014–2018 **BSc, Mathematics**, Peking University, China.

Awards and Honours

- Distinguished Paper Award**, LICS 2025.
- EATCS Distinguished Dissertation Award 2023**.
- Kleene Award for the Best Student Paper**, LICS 2023.
- Best Student Paper Award (Track B)**, ICALP 2023.

Publications and Preprints

Preprints

Ruiwen Dong and Doron Shafrir. S-unit equations in modules and linear-exponential Diophantine equations. *arXiv preprint arXiv:2505.19141*, 2025.

Ruiwen Dong. Submonoid Membership in n-dimensional lamplighter groups and S-unit equations. *arXiv preprint arXiv:2409.07077*, 2024. To appear in ICALP 2025.

Corentin Bodart and Ruiwen Dong. The Identity Problem in virtually solvable matrix groups over algebraic numbers. *arXiv preprint arXiv:2404.02264*, 2024. To appear in LICS 2025, **Distinguished Paper Award**.

Peer-reviewed articles

Ruiwen Dong. Linear equations with monomial constraints and decision problems in abelian-by-cyclic groups. In *36th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2025.

Laurent Bartholdi, Ruiwen Dong, Leon Pernak, and Jan Philipp Wächter. Equations in wreath products. *Semigroup Forum*, 2024. Invited paper.

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

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. Invited paper.

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**. Journal version: invited to special issue of *Logical Methods in Computer Science*.

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. Journal version: *SIAM Journal on Discrete Mathematics*.

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

S-unit equations and the Diophantine problem in abelian-by-cyclic groups.

- Workshop: Diophantine Problem in one-relator inverse monoids, University of East Anglia, UK
May 2025

Linear equations with monomial constraints and decision problems in abelian-by-cyclic groups.

- SODA 2025, New Orleans, USA
January 2025

Submonoid Membership in n-dimensional lamplighter groups and S-unit equations.

- Semigroups, Automata and Languages seminar, University of Porto (online)
December 2024

Semigroup algorithmic problems in metabelian groups, short version.

- STOC 2024, Vancouver, Canada
June 2024

Decision problems in sub-semigroups of metabelian groups, long version.

- 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, short version.

- SODA 2024, Alexandria, USA
January 2024

On the Identity Problem for unipotent matrix groups of nilpotency class at most ten, long version.

○ Verification series seminar, University of Liverpool, UK May 2022

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 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

○ Verification seminar, IRIF (online) March 2022

A new algorithm for finding the input-output equations of differential models.

○ MAX team seminar, Ecole Polytechnique, France October 2020

Reviewing work

Conferences: STOC, SODA, ICALP, LICS, STACS, MFCS

Journals: Journal of Algebra, Mathematics of Computation, SIAM Journal on Computing, Information and Computation, IEEE Transactions on Automatic Control

Languages

Chinese Native, C2

English Fluent, C2

French Fluent, C2

Russian Proficient, C1

Polish Proficient, C1

German Intermediate, B2

Turkish Intermediate, B1

Programming languages and software

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