

Duncan Adamson

Research Fellow and Theme Lead at the Leverhulme Research Centre for Functional Materials Design, University of Liverpool

PERSONAL DATA

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NATIONALITY: *British Citizen*
DATE OF BIRTH: 12/10/1995

WORK AND EDUCATION

APRIL 2023 - Present	Research Fellow and Theme Lead Leverhulme Research Centre for Functional Materials Design, University of Liverpool, UK Research Director: Prof. Paul Spirakis
OCTOBER 2022 - MARCH 2023	Postdoctoral Researcher University of Göttingen, Germany Supervisor: Prof. Florin Manea
SEPTEMBER 2021 - SEPTEMBER 2022	Postdoctoral researcher Reykjavik Univseriy, Iceland Supervisor: Prof. Magnus M. Halldorsson
SEPTEMBER 2018 - DECEMBER 2021	PhD in Computer science, University of Liverpool, UK Thesis: <i>Algorithmic and Combinatorial Problems in Crystal Structure Prediction</i> Supervisors: Prof. Igor Potapov (primary), Dr. Matthew Dyer, Dr Vladimir Gusev. Funded by the Leverhulme Research Centre for Functional Material Design
SEPTEMBER 2013 - JUNE 2018	2:1 Undergraduate Master of Science in COMPUTER SCIENCE, University of Glasgow, UK Dissertation: <i>Maximum least-unstable matchings using integer programming</i> Advisor: Prof. David Manlove

TEACHING

3.1 PhD, Masters and Honours Student Supervision

- PhD Co-Supervisor (Nathan Flaherty)
University of Liverpool
Responsibilities: Weekly meetings with the student, direct feedback on both research results and paper writing, help with the development of new research results.
- Student Project Supervisor, Seminar Algorithmen und Datenstrukturen
University of Göttingen, 2022
Responsibilities: The course focused on teaching students to present a research paper to

the Theoretische Informatik research group at the University of Göttingen. I supervised 3 students within the course, providing them help with understanding and presenting the assigned research papers.

- Co-Supervision of a final year student's Honours Dissertation.
University of Liverpool, Co Supervised with Viktor Zamaraev
Responsibilities: Establishing the underlying theory for the project, helping with guiding the student with the project and holding meetings with the student.

3.2 Guest Lecturing

- Guest Lecturer, Algorithms on Sequences
University of Göttingen, 2022
Responsibilities: I was invited to provide a lecture to the Masters-level course on my research within the field of Algorithms on sequences.
- Guest Lecturer, Seminar Algorithmen und Datenstrukturen
University of Göttingen, 2022
Responsibilities: I was invited to provide a lecture to the Masters-level course on my research within the field of Algorithms and Data-structures.
- Guest Lecturer, Computing using Randomisation
Reykjavik University, 2022
Responsibilities: I was invited to provide a lecture to the Masters-level course on computing using randomisation.

3.3 Examination and Demonstrator Roles

- Oral Examiner, Graph Theory
Reykjavik University, 2022
Responsibilities: This role required me to provide an oral examination to the students studying the graph theory course at Reykjavik University.
- Demonstrator, Efficient Sequential Algorithms
University of Liverpool, 2018-2021
Responsibilities: This role primarily involved small group teaching, both in person and online. This involved weekly seminars going focused on proving the correctness of algorithmic concepts, and demonstrating the execution of algorithms. This required the preparation of teaching materials as well as marking assignments.
- Demonstrator, Software Engineering
University of Liverpool, 2018 - 2019
Responsibilities: This role primarily involved lab teaching. This involved running large weekly labs covering the principles of software engineering. This required weekly preparation for each lab, helping students with solving problems with their code, and marking assignments.
- Demonstrator, Cyber Security
University of Liverpool, 2019 - 2020
Responsibilities: This role primarily involved lab teaching. This involved running small weekly lab sessions covering the principles of Cyber security through practical exercises. This required weekly preparation for each lab, helping students with solving problems with their code, and marking assignments.
- Demonstrator, Foundations of Computer Science
University of Liverpool, 2019-2020
Responsibilities: This role primarily involved lab teaching. This involved running large weekly lab sessions covering the algorithmic foundations of computer science. This

required weekly preparation for each lab, helping students with the implementation of algorithms and marking assignments.

RESEARCH SCHOOLS

- Max Planck Advanced Course on the Foundations of Computer Science
Max Planck Institute for Informatics, Saarbrücken, 2019
Summer school covering various current research topics in Computer Science on the theme *Games, Brains, and Distributed Computing*.
- Kaleidoscope : Complexity as a Kaleidoscope
Institut Henri Poincaré, 2019
Summer school covering current research in complexity theory, primarily proof and circuit complexity.
- Manycore Summer School
MaRIONet, University of Glasgow, 2018
Research school focused on using highly parallel (Manycore) systems for computational challenges.
- CERN Spring Campus.
University of Glasgow, 2017
Research school focused on the big data challenges faced by CERN.

GRANTS AND AWARDS

- PhD Scholarship
University of Liverpool, 2018 - 2021
Fully funded scholarship to study at the University of Liverpool along with an annual research budget.
- Travel Grant to visit Royal Holloway, University of London
Materials Innovation Factory, University of Liverpool, 2020
Grant to visit Dr. Argyris Deligkas at Royal Holloway University of London
- Travel Grant to attend *Measurability, Ergodic Theory and Combinatorics* at the University of Warwick
Grant for travel and accommodation to attend the symposium *Measurability, Ergodic Theory and Combinatorics* at the university of Warwick.
- Travel grant to attend the *One-Day Meeting in Combinatorics* at the University of Oxford
Mathematical Institute, University of Oxford, 2019
A grant covering travel costs to attend the one day meeting in combinatorics at the mathematical institute in the university of Oxford.
- Travel grant to attend ADFOCS 2019
Max Planck Institute for Informatics, Saarbrücken, 2019
Grant covering travel and accommodation costs to attend the 20th Max Planck Advanced Course on the Foundations of Computer Science.
- Accommodation grant to attend *Kaleidoscope : Complexity as a Kaleidoscope*
Institut Henri Poincaré, 2019
Accommodation provided to attend to the *Kaleidoscope : Complexity as a Kaleidoscope* summer school.
- Gridwars AI programming Challenge
CERN Spring Campus, 2017
First place prize at CERN Spring Campus Gridwars AI programming challenge.

IT AND PROGRAMMING SKILLS

Programming Languages

Proficient with: Java, Python, Gurobi, \LaTeX
Competent with: Haskell, JavaScript, C, Bash, VB.net, HTML, MiniZinc, D-Wave Leap
Other
Experience with: Microsoft office suite, Linux, Windows

PROFESSIONAL MEMBERSHIPS

- Algorithms UK (AlgoUK).
- Association for Computing Machinery (ACM).
- Association Computability in Europe (CiE).
- European Association for Theoretical Computer Science (EATCS).
- London Mathematical Society (LMS).

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PRESENTATIONS

SOFSEM 2023 - Novy Smokovec	<i>The k-centre problem for classes of cyclic words</i>
ACTO Seminar 2022 - Liverpool	<i>The k-centre problem for classes of cyclic words</i>
DCFS 2022 - Debrecen	<i>Ranking Binary Unlabelled Necklaces in Polynomial Time</i>
SAND 2022 - Online	<i>Faster exploration of some temporal graphs</i>
Málstífa í stærfræði Háskóla Íslands (University of Iceland)	<i>Combinatorial Structures for Crystal Structure Prediction</i>
CPM 2021 - Wrocław	<i>Ranking Bracelets</i>
BCTCS 2021 - Liverpool	<i>Ranking Bracelets</i>
BCTCS 2020 - Swansea	<i>Multidimensional Necklaces: Enumeration, Generation, Ranking, and Unranking</i>
SOFSEM 2020 - Limassol, Cyprus	<i>Crystal Structure Prediction by Vertex Removal in Euclidean Space</i>
ACTO Seminar 2020 - Liverpool	<i>On the hardness of Crystal Structure Prediction</i>
ECO Seminar 2020 - Liverpool	<i>Maximum least-unstable matchings</i>
BCTCS 2019 - Durham	<i>Crystal Structure Prediction by Vertex Removal in Euclidean Space</i>

PUBLICATIONS

- [1] **D. Adamson**, M. M. Halldórsson, and A. Nolin*. Distributed algorithms for colouring hypergraphs.
- [2] **D. Adamson***. Ranking and unranking k-subsequence universal words. In *To appear at WORDS 2023*.
- [3] **D. Adamson**, M. Kosche, T. Koß*, F. Manea, and S. Siemer. Ranking and unranking k-subsequence universal words. In *To appear at WORDS 2023*.
- [4] **D. Adamson***, A. Deligkas, V. V. Gusev, and I. Potapov. The k-centre problem for classes of cyclic words. In *SOFSEM 2023: Theory and Practice of Computer Science - 48th International Conference on Current Trends in Theory and Practice of Computer Science*, volume 13878 of *Lecture Notes in Computer Science*, pages 385–400. Springer, 2023.
- [5] **D. Adamson***, V. V. Gusev, I. Potapov, and A. Deligkas. The Complexity of Periodic Energy Minimisation. In *47th International Symposium on Mathematical Foundations of Computer Science (MFCS 2022)*, volume 241, pages 37:1–37:15. Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2022.
- [6] **D. Adamson***. Ranking binary unlabelled necklaces in polynomial time. pages 15–29, 2022.
- [7] **D. Adamson***, V. V. Gusev, D. Malyshev, and V. Zamaraev. Faster exploration of some temporal graphs. *1st Symposium on Algorithmic Foundations of Dynamic Networks (SAND 2022)*, April 2022.
- [8] **D. Adamson***, A. Deligkas, V. V. Gusev, and I. Potapov. Ranking bracelets in polynomial time. *31st Annual Symposium on Combinatorial Pattern Matching (CPM)*, June 2021.
- [9] **D. Adamson**, A. Deligkas, V. V. Gusev, and I. Potapov*. On the hardness of energy minimisation for crystal structure prediction. *Fundamenta Informaticae*, 184:1–23, February 2022.
- [10] **D. Adamson***, A. Deligkas, V. V. Gusev, and I. Potapov. On the hardness of energy minimisation for crystal structure prediction. *46th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM) 2020*, 12011:587–596, January 2020.

SUBMISSIONS

- [11] **D. Adamson***, A. Deligkas, V. V. Gusev, and I. Potapov. Combinatorial algorithms for multidimensional necklaces.
- [12] **D. Adamson***, A. Deligkas, V. V. Gusev, and I. Potapov. Ranking bracelets in polynomial time (journal submission).
- [13] V. V. Gusev*, **D. Adamson**, A. Deligkas, D. Antypov, C.M. Collins, G.R. Darling, M.S. Dyer P. Krysta, I. Potapov, P. Spirakis, and M.J. Rosseinsky. Non-heuristic algorithms, guarantees and quantum computing for crystal structure prediction. 2022.

PREPARATION

- [14] **D. Adamson**, M. M. Halldórsson, and A. Nolin. Efficient algorithms for maintaining colourings in highly dynamic distributed graphs. *Under Preperation*, 2022.

*** denotes corresponding author**

Current versions of any manuscript under preparation or review can be presented upon request.

REFERENCES

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- Prof. Magnus M. Halldorsson Department of Computer Science
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