Dylan McDermott

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Research interests

- Algebraic and coalgebraic structures in computer science, especially as they appear in the theory of programming languages
- Category theory, especially formal category theory and its application to algebraic theories
- Semantics and analysis of programs with computational effects (such as mutable state, exceptions, nondeterminism, concurrency)

Employment

Nov 2019 – Present	**Post-doctoral researcher**, Reykjavik University, Iceland Supervised by Tarmo Uustalu
Jul 2016 – Sep 2016	**Research intern**, Microsoft Research, Cambridge, UK
Aug 2017 – Oct 2017	**Research intern**, Microsoft Research, Cambridge, UK

Education

Oct 2016 – Oct 2019	**PhD in Computer Science**, University of Cambridge, UK Thesis: Reasoning about effectful programs and evaluation order Supervised by Alan Mycroft Thesis submitted Oct 2019, defended Feb 2020
Oct 2012 – Jun 2016	**BA (Hons) and MEng in Computer Science**, University of Cambridge, UK

Publications

- **Dylan McDermott** and Alan Mycroft. Galois connecting call-by-value and call-by-name. To appear in Logical Methods in Computer Science. Available at dylanm.org/drafts/value-name-lmcs.pdf.
- **Dylan McDermott**, Yasuaki Morita and Tarmo Uustalu. A type system with subtyping for WebAssembly's stack polymorphism. Proceedings of ICTAC 2022, Springer. [doi:10.1007/978-3-031-17715-6_20]
- **Dylan McDermott** and Tarmo Uustalu. Flexibly graded monads and graded algebras. Proceedings of MPC 2022, Springer. [doi:10.1007/978-3-031-16912-0_4]
- Shin-ya Katsumata, **Dylan McDermott**, Tarmo Uustalu, and Nicolas Wu. Flexible presentations of graded monads. Proceedings of the ACM on Programming Languages (ICFP 2022), ACM. [doi:10.1145/3547654]
- **Dylan McDermott** and Alan Mycroft. Galois connecting call-by-value and call-by-name. Proceedings of FSCD 2022, Dagstuhl Publishing. [doi:10.4230/LIPIcs.FSCD.2022.32]
- Flavien Breuvart, **Dylan McDermott**, and Tarmo Uustalu. Canonical gradings of monads. Proceedings of ACT 2022, EPTCS. [doi:10.4204/EPTCS.380.1]

- **Dylan McDermott** and Tarmo Uustalu. What makes a strong monad? Proceedings of MSFP 2022, EPTCS. [doi:10.4204/EPTCS.360.6]
- **Dylan McDermott**, Exequiel Rivas, and Tarmo Uustalu. Sweedler theory of monads. Proceedings of FoSSaCS 2022, Springer. [doi:10.1007/978-3-030-99253-8_22]
- Nathanael Arkor and **Dylan McDermott**. Abstract clones for abstract syntax. Proceedings of FSCD 2021, Dagstuhl Publishing. [doi:10.4230/LIPIcs.FSCD.2021.30]
- **Dylan McDermott**, Maciej Piróg and Tarmo Uustalu. Degrading lists. Proceedings of PPDP 2020, ACM. [doi:10.1145/3414080.3414084]
- **Dylan McDermott** and Alan Mycroft. Extended call-by-push-value: reasoning about effectful programs and evaluation order. Proceedings of ESOP 2019, Springer. [doi:10.1007/978-3-030-17184-1_9]
- Ohad Kammar and **Dylan McDermott**. Factorisation systems for logical relations and monadic lifting in type-and-effect system semantics. Proceedings of MFPS 2018, Elsevier. [doi:10.1016/j.entcs.2018.11.012]
- **Dylan McDermott** and Alan Mycroft. Call-by-need effects via coeffects. Open Computer Science 8(1), pp. 93–108, 2018. [doi:10.1515/comp-2018-0009]
- Matthew Parkinson, Dimitrios Vytiniotis, Kapil Vaswani, Manuel Costa, Pantazis Deligiannis, **Dylan McDermott**, Aaron Blankstein, and Jonathan Balkind. Project Snowflake: Non-blocking Safe Manual Memory Management in .NET. Proceedings of OOPSLA 2017, ACM. [doi:10.1145/3141879]

Academic activities

- Program committees: Nordic Workshop on Programming Theory (2021, 2022, 2023), Applied Category Theory (2022), International Conference on Functional Programming (2023)
- Journal refereeing: Theoretical Computer Science (2019), Mathematical Structures in Computer Science (2021, 2022, 2023), Logic and Algebraic Methods in Programming (2022, 2023), Logical Methods in Computer Science (2022, 2024)
- Conference refereeing: ICALP (2020, 2022), FSCD (2020, 2021), FM (2021), APLAS (2021, 2023), CALCO (2021), TYPES (2021), CMCS (2022), MFPS (2022, 2023), LICS (2023), ICTAC (2023), FoSSaCS (2024)
- Thesis committees: Elena di Lavore (PhD, Tallinn University of Technology, November 2023)
- Member of the management committee of COST action CA20111 (European Research Network on Formal Proofs)
- Participant in NII Shonan meeting 203 (Effect handlers and general-purpose languages, September 2023)
- Between 2018 and 2021, I was involved in the computer science admissions test used by several University of Cambridge colleges (including question design, marking, and administration).

Teaching

- Teaching assistant for second year undergraduate Programming Languages course at Reykjavik University (2019–2022).
- Co-supervisor (with Tarmo Uustalu) of Yasuaki Morita (PhD student at Reykjavik University, 2021–Present).
- Co-supervisor (with Tarmo Uustalu) of Calvin Lee (MSc, Reykjavik University, 2023–Present).
- Co-supervisor (with Alan Mycroft) of Alexander Taylor (MEng, University of Cambridge, 2018–2019).
- Undergraduate supervisions (small-group teaching) for various courses at the University of Cambridge.

Manuscripts

- Nathanael Arkor and **Dylan McDermott**. Relative monadicity. Submitted to Journal of Algebra. [arXiv:2305.10405]
- Nathanael Arkor and **Dylan McDermott**. The formal theory of relative monads. Submitted to Journal of Pure and Applied Algebra. [arXiv:2302.14014]
- Nathanael Arkor and **Dylan McDermott**. Higher-order algebraic theories. Available at dylanm.org/drafts/hoat.pdf (last updated January 2021).

Grants

- COST action CA20111 – European Research Network on Formal Proofs: co-proposer and member of Working Group 6 on Type Theory.
- PhD funded by a doctoral scholarship awarded by the EPSRC.

Awards and recognition

- Winner of EAPLS best paper award in 2019 for "Extended call-by-push-value: reasoning about effectful programs and evaluation order".

Selected talks

- How to construct graded monads. Symposium and festschrift to celebrate the work of Prof. Alan Mycroft, December 2023.
- Flexible presentations of graded monads. Algebra, Logic, and Computation seminar, University of Minho, Portugal, October 2023.
- Flexibly graded monads and graded algebras. Higher-order Programming with Effects, September 2022.
- Canonical gradings of monads. Applied Category Theory, June 2022.
- Higher-order algebraic theories. Partout seminar, LIX, Paris, May 2022.
- What makes a strong monad? Mathematically Structured Functional Programming, April 2022.
- Interaction laws of monads and comonads. Tutorial at ICFP (joint with Exequiel Rivas and Tarmo Uustalu), August 2021.