

Matthew Alan Le Brun

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Education

University of Glasgow

2022 – Present

PhD Computing Science

- Thesis: *Multiparty Session Types for Distributed and Failure-Prone Systems*
- Supervisors: Ornela Dardha, Simon Fowler, and Paul Harvey
- On track to submit in April 2025

University of Malta

2020 – 2021

Master of Science

- Thesis: *On Extending and Verifying the Raft Consensus Algorithm*
- Supervisor: Adrian Francalanza
- Passed with Distinction

University of Malta

2017 – 2020

BSc (Hons) (Computing Science)

- Final Year Project: *On Implementing and Evaluating the Raft Distributed Consensus Algorithm*
- Supervisors: Adrian Francalanza and Duncan Paul Attard
- Focus: Computability and Complexity, Programming Languages, Concurrency and Distributed Systems

Publications

Matthew Alan Le Brun, Simon Fowler, and Ornela Dardha. *Multiparty Session Types with a Bang!*. To appear in European Symposium on Programming (ESOP) 2025.

Matthew Alan Le Brun and Ornela Dardha. *MAG π !: The Role of Replication in Typing Failure-Prone Communication*. In International Conference on Formal Techniques for Distributed Objects, Components, and Systems (FORTE), pp. 99-117. 2024.

Matthew Alan Le Brun and Ornela Dardha. *MAG π : Types for Failure-Prone Communication*. In European Symposium on Programming (ESOP), pp. 363-391. Cham: Springer Nature Switzerland, 2023.

Matthew Alan Le Brun, Duncan P. Attard, and Adrian Francalanza. *Graft: General Purpose Raft Consensus in Elixir*. In Proceedings of the 20th ACM SIGPLAN international workshop on Erlang, pp. 2-14. 2021.

Work Experience

Software Engineer (Part Time)

2020 – 2021

CCBill EU

- Integrated a centralised log monitor for a distributed microservices architecture.

Software Development Intern

2018 – 2020

CCBill EU

- Developed a WebApp (full-stack) for an internal-use employee management system.

Research Outreach

Organiser

- Scottish Programming Languages Seminar (SPLS) July 2022
- Concurrency Lab (CoLab) Reading Club 2022-2023
- Scottish Programming Languages and Verification Summer School (SPLV) 2026

Programme Committee Member

- 15th Workshop on Programming Language Approaches to Concurrency and Communication-centric Software (PLACES) 2024
- 17th Interaction and Concurrency Experience (ICE) 2024
- 18th Interaction and Concurrency Experience (ICE) 2025

Artifact Evaluation Committee Member

- International Joint Conferences on Theory and Practice of Software (ETAPS): ESOP/FASE/FoSSaCS 2024

Publicity Co-Chair

- International Federated Conference on Distributed Computing Techniques (DisCoTec) 2025 and 2026

External Reviewer

- **Conferences and Workshops:** Euro-Par 2021, CONCUR 2022, FORTE 2023
- **Journals:** Information and Computation, Science of Computer Programming

Invited Participant

- Behavioural Application Program Interfaces (BehAPI) Tutorial Day 2023

Summer Schools

- Participant and speaker (lightning talk) at the Scottish Programming Languages and Verification Summer School (SPLV) 2022
- Participant at the Scottish Programming Languages and Verification Summer School (SPLV) 2024

Science Communicator

- Glasgow Science Festival 2022 and 2023

Research Visits

- Secondment at Carnegie Mellon University, PA, USA (duration: 1 month), 2023

Researcher Representatives Committee Member

- University of Glasgow's junior representative for the Scottish Programming Languages Institute (SPLI)

Open Source

I am the primary developer and maintainer of the open source library **Graft**, an Elixir library for building fault-tolerant applications over the Raft consensus algorithm. The library follows community standards to offer seamless integration of OTP applications with a consensus backend, and can be optionally deployed with runtime monitors to verify the correctness of production applications. <https://github.com/MatthewAlanLeBrun/graft>.

Presentations

Talk: <i>Multiparty Session Types with a Bang!</i> . Scottish Programming Languages Seminar (SPLS).	<i>February 2025</i>
Invited Talk: <i>Multiparty Session Types with a Bang!</i> . Theoretical Computer Science Seminar, University of Birmingham.	<i>February 2025</i>
Invited Talk: <i>Multiparty Session Types with a Bang!</i> . FATA Seminar, University of Glasgow.	<i>February 2025</i>
Talk: <i>MAGπ!: The Role of Replication in Typing Failure-Prone Communication.</i> 19th International Federated Conference on Distributed Computing Techniques.	<i>June 2024</i>
Talk: <i>MAGπ!: The Role of Replication in Typing Failure-Prone Communication.</i> PLUG Seminar, University of Glasgow.	<i>March 2024</i>
Invited Talk: <i>MAGπ: Types for Failure-Prone Communication.</i> Programming Languages and Systems (PLAS) Seminar, University of Kent.	<i>February 2024</i>
Talk: <i>Towards Session-Typed Consensus.</i> 30 Years of Session Types (ST30).	<i>October 2023</i>
Talk: <i>MAGπ: Types for Failure-Prone Communication.</i> 32nd European Symposium on Programming.	<i>April 2023</i>
Talk: <i>MAGπ: Types for Failure-Prone Communication.</i> 14th Workshop on Programming Language Approaches to Concurrency and Communication cEntric Software.	<i>April 2023</i>
Talk: <i>MAGπ: Types for Failure-Prone Communication.</i> Scottish Programming Languages Seminar (SPLS).	<i>March 2023</i>
Invited Talk: <i>Non-Classical Logics: True, False and Everything In-Between.</i> Concurrency Lab (CoLab) Reading Club, University of Glasgow.	<i>February 2023</i>
Invited Talk: <i>MAGπ: Types for Failure-Prone Communication.</i> PLUG Seminar, University of Glasgow.	<i>November 2022</i>
Lightning Talk: <i>Session Types for Distributed Communication.</i> Scottish Programming Languages Seminar (SPLS).	<i>July 2022</i>
Invited Talk: <i>On Extending and Verifying the Raft Consensus Algorithm.</i> Concurrency Lab (CoLab) Reading Club, University of Glasgow.	<i>January 2022</i>
Talk: <i>Graft: General Purpose Raft Consensus in Elixir.</i> 20th ACM SIGPLAN International Workshop on Erlang.	<i>August 2021</i>

Funding

- SICSA Research Scholar fund. Awarded to attend and present at the *30 years of session types* (ST30) workshop. *£500*
- Behavioural Application Program Interfaces (BehAPI) secondment. Awarded to establish an international collaboration with Carnegie Mellon University (CMU) and investigate logical interpretations of session types for failure-prone communication. *€2,000*
- University of Glasgow College of Science and Engineering mobility scholarship. Awarded to supplement living expenses for my collaboration with CMU. *£2,000*

Teaching Experience

Graduate Teaching Assistant

This role involves leading lab and tutorial sessions, guiding students through worksheets in an interactive classroom setting, addressing any questions on the course material, and assisting with the design and marking of assignments.

Programming Languages
Theory of Computation

2023 – Present
2023

Tutor

This role involved leading tutorial sessions, guiding students through worksheets in an interactive classroom setting, and addressing any questions on the course material.

Programming Paradigms
Formal Languages and Automata

2021
2020 – 2021

Invited Lectures

- *Programming Languages (H)*. University of Glasgow, 2024. Delivered two lectures of 2 hours each on the foundations of programming language implementation; one lecture discussed the approach of interpretation and compilation, the other was on approaches to parsing.
- *Theory of Computation (H)*. University of Glasgow, 2023. Delivered two lectures of 2 hours each on the pi-calculus as a foundation for concurrent computation; one lecture focused on equivalence theories, the other on type systems.
- *Programming Paradigms*. University of Malta, 2021. Delivered two lectures of 2 hours each on concurrent programming with asynchronous message passing. Lectures focused on the actor model and Erlang, with an in-depth look at fault-isolation and fault-tolerance.

Supervision

- Ruby Graham (MSci integrated masters). Co-supervised with Ornela Dardha. *An implementation of MAG π : Types for Failure-Prone Communication*. 2023 – 2024.
- Yuge Wang (MSc CS+). *Extending Graft with Dynamic Cluster Membership*. 2023.