

Kyle Simpson

Curriculum Vitæ

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University Education

- since 2017 **PhD Degree in Computing Science**, *University of Glasgow*, Scotland.
Supervisor: Prof. Dimitrios P. Pezaros
Thesis (ongoing): *Programmable, Data-driven Networks for the Masses*
Tutor (see *Teaching* section)
Research Community integration (see *Research Community Activities* section)
- 2012–2017 **MSci Degree in Computing Science**, *University of Glasgow*, Scotland.
Grade: **1st Class Hons** (highest grade). Equivalent to combined BSc Hons and MSc.
Class prize—highest overall grade in years 3–5.
MSci Thesis: *Graph Models and Maximum Common Subgraph for Character Analysis*
BSc Thesis: *Onion-Routed Communication Over WebRTC*

Professional Experience

- 2019–2020 **Affiliate**, *Lawrence Berkeley National Laboratory*, USA (CA).
I led investigation into flow classification on high-speed networks using state-of-the-art machine learning models and programmable network hardware. Work to be presented at IEEE GLOBECOM 2020.
- 2019 **Research Intern**, *ESnet, Lawrence Berkeley National Laboratory*, USA (CA), 3 months.
I undertook the design, implementation, and testing of software written in Go for high-throughput stateful traffic analysis in the future design of a large-scale WAN. This included modification of programmable switch firmware, deep analysis of the network stack, and close integration with operations staff. Presented at IMC 2019.
- 2016 **Research Intern**, *University of Glasgow*, Scotland, 2 months.
Problem model design, implementation and optimisation in Constraint and Integer Programming paradigms (Choco3 and Gurobi solvers), working with Prof. David Manlove and Dr. Patrick Prosser.

Open-source Contributions

- since 2020 **Songbird**, *Rust*.
Standalone VOIP driver for Discord. I am responsible for its architecture, initial implementation, and maintenance. This work spawned the stream-catcher minimal-locking bytestream cache.
- since 2018 **Serenity**, *Rust*.
Discord bot client. I primarily maintained the voice system.
- Misc.**
I have contributed bug fixes and improvements to the Rust compiler, Open vSwitch, twilight-rs, and amethyst-rs.

Awards and Scholarships

- 2017 **EPSRC PhD Scholarship**, *approx. £63,500*.
Engineering and Physical Sciences Research Council (EPSRC) funded PhD (3.5 years) at the University of Glasgow.
- 2015–2017 **Class Prizes**, *£100 ea.*
Awarded to the student with the highest GPA in **Level 3** (18.8/22.0), **Hons** (20.7/22.0), and **MSci** (20.3/22.0)

Research Community Activities

Program Committees & Reviewing

- **Shadow Program Committee**: ACM EuroSys 2021.
- **Chairing**: Session chair (IEEE GLOBECOM 2020, NetAI).
- **External reviewer for conferences**: IEEE ICC (International Conference on Communications), IFIP Networking, IFIP/IEEE IM (International Symposium on Integrated Network Management), and IEEE INFOCOM (International Conference on Computer Communications).
- **External reviewer for journals**: Elsevier Computer Networks, IEEE Communications Letters, and IEEE TNSM (Transactions on Network and Service Management).

Research Networks

- Member of the **IEEE** (ComSoc and Young Professionals), the UK Many-core Research, Innovation and Opportunities Network (**MaR-IONet**), the Networked Systems Research Laboratory (**Netlab**) at the University of Glasgow, and regular participant of the SCottish Networking Event (**SCONE**).

Publications

- 2020** [1] **Kyle A. Simpson**, Richard Cziva, and Dimitrios P. Pazaros. “Seiðr: Dataplane Assisted Flow Classification Using ML”. In: *2020 IEEE Global Communications Conference: Next-Generation Networking and Internet (GlobeCom2020 NGNI)*. To appear. CORE 2020 Ranking: B. Taipei, Taiwan, Dec. 2020.
- [2] **Kyle A. Simpson**, Simon Rogers, and Dimitrios P. Pazaros. “Per-Host DDoS Mitigation by Direct-Control Reinforcement Learning”. In: *IEEE Trans. Netw. Serv. Manag.* 17.1 (2020). SJR **Ranking: Q1**, pp. 103–117.
- 2017** [3] Ciaran McCreesh, Patrick Prosser, **Kyle Simpson**, and James Trimble. “On Maximum Weight Clique Algorithms, and How They Are Evaluated”. In: *Principles and Practice of Constraint Programming - 23rd International Conference, CP 2017, Melbourne, VIC, Australia, August 28 - September 1, 2017, Proceedings*. CORE 2017 **Ranking: A**. 2017, pp. 206–225.

Talks and Presentations

- 12/2020 **Talk**, *Fifth Annual UK Systems Research Challenges Workshop*, Virtual Seminar Series.
Title: Towards In-Switch Reinforcement Learning
- 11/2020 **Talk**, *Systems Section Talk*, Sir Alwyn Williams Building, University of Glasgow, Scotland.
Title: Seiðr—Dataplane Assisted Flow Classification Using ML
- 11/2019 **Talk**, *RSC Internship Workshop*, Sir Alwyn Williams Building, University of Glasgow, Scotland.
Title: Internship Experience and Advice
- 10/2019 **Poster**, *ACM IMC 2019 (Internet Measurement Conference)*, KIT Royal Tropical Institute, Amsterdam, The Netherlands.
Title: Real-time Performance Analysis of High-Speed, International Science Network Flows
- 08/2019 **Talk**, Shyh Wang Hall, Lawrence Berkeley National Laboratory, USA (CA).
Title: ESnet6 HighTouch Collector: Overview and Future
- 08/2019 **Poster**, Shyh Wang Hall, Lawrence Berkeley National Laboratory, USA (CA).
Title: ESnet6 HighTouch Services: TCP at the Nanosecond Scale
- 02/2019 **Talk**, *Systems Section Talk*, Sir Alwyn Williams Building, University of Glasgow, Scotland.
Title: Improved Direct-Control Reinforcement Learning for DDoS Prevention

- 09/2018 **Talk**, SCONE 20 (SCOTTish Networking Event), Informatics Forum, University of Edinburgh, Scotland.
Title: Improving Direct-Control Reinforcement Learning for Network Intrusion Prevention
- 04/2018 **Talk**, *Algorithmics Group Talk*, Sir Alwyn Williams Building, University of Glasgow, Scotland.
Title: Reinforcement Learning in Network Defence/Control

Teaching

As a PhD Student at the University of Glasgow

- 2020–2021
- Teaching Assistant: *MSc Summer Project Support*.
 - Teaching Assistant: *Data Fundamentals*, undergraduate course (Level H/M).
- 2019–2020
- Teaching Assistant: *Data Fundamentals*, undergraduate course (Level H/M).
 - Teaching Assistant: *Systems Programming*, undergraduate course (Level H/M).
 - Teaching Assistant: *Machine Learning*, undergraduate course (Level H/M).
 - Teaching Assistant: *Machine Learning for Data Scientists*, postgraduate course (Level M).
 - Teaching Assistant: *Operating Systems*, undergraduate course (Level H/M).
 - Teaching Assistant: *Networked Systems*, undergraduate course (Level H/M).
 - Teaching Assistant: *Cybersecurity Fundamentals*, postgraduate course (Level M).
 - Teaching Assistant: *Programming Languages*, undergraduate course (Level H/M).

- 2018–2019
- Teaching Assistant: *Quantum Technology and Cryptography Summer School*, introductory lessons for high-school level students.
 - Teaching Assistant: *Data Fundamentals*, undergraduate course (Level H/M).
 - Teaching Assistant: *Networks and Operating Systems Essentials*, undergraduate course.
 - Teaching Assistant: *Cybersecurity Fundamentals*, postgraduate course (Level M).
 - Teaching Assistant: *Programming Languages*, undergraduate course (Level H/M).
- 2017–2018
- Teaching Assistant: *Advanced Programming (IT)*, postgraduate course (Level M).

As an MSci Student at the University of Glasgow

- 2016–2017
- Teaching Assistant: *Programming Languages*, undergraduate course (Level H/M).
 - Teaching Assistant: *Advanced Programming*, undergraduate course (Level H/M).
 - Teaching Assistant: *Advanced Programming (IT)*, postgraduate course (Level M).
 - Teaching Assistant: *Networked Systems*, undergraduate course (Level H/M).