Kyle Simpson

Résumé

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Kyle Simpson is a Research Associate in the Networked Systems Research Laboratory at the *School of Computing Science, University of Glasgow*, and has previously acted as an Affiliate and Research Intern at the *Lawrence Berkeley National Laboratory*. **Kyle is passionate about designing usable, well-tested, and performant systems, is an excellent technical writer, and is always keen to learn about and toy with 'weird' architectures and new tools.** Their research has included designing low-latency, safe, and secure network function stacks built on Rust for field devices, as well as the use of programmable dataplane technology to make tomorrow's networks smarter and more adaptive.

Professional Experience

since 2021   **Research Assistant**, *University of Glasgow*, Scotland
Currently investigating CPU and power-efficient data/control plane designs for low latency packet processing (Rust, XDP) on resource-constrained devices, with strong PUF-based authentication.

2019–2020   **Affiliate**, *Lawrence Berkeley National Laboratory*, USA (CA)
Led investigation into flow classification on high-speed networks using programmable network hardware. Work presented at IEEE GLOBECOM '20.

2019   **Research Intern**, *ESnet, Lawrence Berkeley National Laboratory*, USA (CA), 3 months
Designed, implemented, and tested software written in Go for high-throughput stateful traffic analysis in research WANs. This included deep analysis of the network stack and close integration with operations staff. Work presented at ACM IMC '19.

2017–2022   **Research Student**, *University of Glasgow*, Scotland
Researched the intersection of programmable hardware/host dataplanes with data-driven networking: online learning in resource-limited network devices, P4-based data reduction to enable classification at 100 Gbit/s. Work published in IEEE TNSM, presented at IFIP NOMS '22 and ACM CoNEXT '21.

University Education

2017–2022   **PhD, Computing Science**, *University of Glasgow*, Scotland
Thesis: *Online Learning on the Programmable Dataplane*

2012–2017   **MSci (1st Class), Computing Science**, *University of Glasgow*, Scotland
Focus: *Networks, Operating Systems, Combinatorics.*
Class Prize 2015–2017.

Skills

- **Languages**: Rust, C, P4 (Tofino), Go, Javascript, Typescript, Python, Java, C++, SQL, and C#.

- **Tech**: Networked and distributed applications, embedded SmartNIC programming, eBPF, XDP, DPDK, SDN control and data plane design, and Linux testbed administration.

- **Presentation**: Years of **technical and scientific writing** experience (publications, OSS documentation, blogs), data analysis, oral presentation.

- **Critical analysis**: Scientific review and shadow programme committee experience for high-impact venues, e.g., ACM EuroSys, IEEE INFOCOM, IEEE TNSM.

Open-source Involvement

since 2020   **Songbird**, *Rust*
Standalone VOIP driver for Discord. I am responsible for its architecture, initial implementation, and maintenance. This work spawned the streamcatcher minimal-locking bytestream cache.

2018–2021   **Serenity**, *Rust*
Discord bot client. I primarily maintained the voice system.

Contributions
I have contributed bug fixes and improvements to the Rust compiler, Open vSwitch, Symphonia, redbpf, xsk-rs, twilight-rs, and amethyst-rs.

Selected Publications

2022   **"Revisiting the Classics: Online RL in the Programmable Dataplane"**, *IEEE/IFIP NOMS*, SICSA Best Paper '22

2021   **"Poster: Online RL in the programmable dataplane with OPaL"**, *ACM CoNEXT*, CORE Rank A

2020   **"Per-Host DDoS Mitigation by Direct-Control Reinforcement Learning"**, *IEEE TNSM Special Issue*, SJR Rank Q1