# Kyle Simpson

*Résumé*

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Kyle Simpson is an Extensibility Engineer with *Arista Networks*, and has previously served as a Researcher at the *School of Computing Science, University of Glasgow* and *Lawrence Berkeley National Laboratory*. **Kyle is passionate about designing usable, well-tested, and performant networked 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 (P4-)programmable dataplane technology to make tomorrow's networks smarter and more adaptive.

## Professional Experience

since 2023 **Extensibility Engineer**, *Arista Networks*
Automation of datacentre networks (MP-BGP EVPN).

2021-2022 **Research Assistant**, *University of Glasgow*
Designed CPU and power-efficient dataplanes for low latency packet processing (*Rust, XDP*) on resource-constrained devices. Responsible for *P4 BMv2→Tofino* conversion on behalf of colleagues. Work to be presented at IFIP Networking '23.

2019–2020 **Affiliate**, *Lawrence Berkeley National Laboratory*
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*, 3 months
Designed and implemented telemetry capture in *P4*, and high-throughput stateful traffic analysis in *Go* for 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*
Researched the intersection of programmable 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)**, **Python**, Go, Javascript, Typescript, 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.
- **Certification**: Arista ACE:L3 (MP-BGP EVPN), and ACE:CVP.
- **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 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

2023 **"Galette: A Lightweight XDP Dataplane on Your Raspberry Pi"**, *IEEE/IFIP Networking*

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

*Last updated on May 21, 2023*