Simon Masson

PhD and engineer in cryptography

France
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31 years

Professional experience

Feb. 2025 – Today	**Cryptography engineer**, *ZKNox, remote* Research and development of post-quantum cryptography in the context of blockchain.
Feb. 2024 – Jul. 2024	**Intern in underwater signal processing**, *Puerto Madryn (AR) and Gandía (ES)* Signal analysis for characterizing the underwater seabed.
Apr. 2021 – Feb. 2023	**Cryptography engineer**, *Heliax, remote* Implementation of zero-knowledge proofs in Python and Rust for Anoma. Optimization of finite field arithmetic, elliptic curve group law, and proof circuits.
Jan. 2018 – Jan. 2021	**PhD student and engineer**, *Thales, Gennevilliers (FR)* Generation of pairing-friendly elliptic curves resisting Number Field Sieve variants. Construction of a verifiable delay function from isogeny-based and pairing-based cryptography. Cryptanalysis of post-quantum constructions based on supersingular isogenies.
2019	**Computer Science teacher**, *Paris Diderot Univeristy* Introduction to Java (48 hours) and Python (24 hours).
2017	**Intern in elliptic curve cryptography**, *Thales, Gennevilliers (FR)* Development of a tool for searching dimension 4 GLV elliptic curves. Implementation of the fast scalar multiplication for a curve defined modulo $2^{255} - 19$.

Education

2018–2021	**PhD in cryptography**, Lorraine University, Nancy (FR) Algorithmic of curves in the context of bilinear and post-quantum cryptography. Advisors: Emmanuel Thomé and Aurore Guillevic.
2022–2024	**WAVES Master**, **W**aves, **A**coustics, **V**ibrations, **E**ngineering and **S**ound Coimbra (Portugal), Valencia (Spain) and Marseille (FR). Ranked 1st/12 (16.8/20).
2017	**Applied Algebra Master**, *Paris Saclay University*, Ranked 1st/12 (16.7/20).
2016	**Agrégation de Mathématiques**, *Rennes 1 University*, Ranked 92nd/306. Competitive mathematics exam.
2014	**Bachelor of Mathematics**, *Rennes 1 University*

Programming languages

LaTeX	● ● ●	Scientific paper, slides, posters
Python, Magma	● ● ●	Proofs of concept for cryptography research
Matlab	● ● ○	Signal processing, simulation of non-linear equations
Rust, C	● ● ○	Optimized modular arithmetic and elliptic curve scalar multiplication
Git, Bash	● ● ○	Daily use for various projects
Java	● ○ ○	Basic knowledge, teaching experience

Languages

French (fluent), english (spoken, written), spanish (spoken, written).

Hobbies

Volley-ball, music, magic tricks.

Publications

2024   **Embedded curves and embedded families for SNARK-friendly curves**, *(in progress)*, with Aurore Guillevic

Extension and generalization of a method for searching curves using imaginary quadratic field results. Applications for recursive zero-knowledge proof constructions.

2024   **Bandersnatch: a fast elliptic curve built over the BLS12-381 scalar field**, *(Designs, Codes and Cryptography)*, with Antonio Sanso and Z. Zhang

Construction of an efficient and secure elliptic curve embedded above BLS12-381, using the Complex Multiplication method. Efficient implementation of the GLV acceleration using the degree 2 endomorphism.

2021   **Algorithmic of curves in the context of bilinear and post-quantum cryptography**, *PhD thesis*

2020   **Cocks-Pinch curves of embedding degrees five to eight and optimal ate pairing computation**, *(Designs, Codes and Cryptography)*, with Aurore Guillevic and Emmanuel Thomé.

Generation of efficient pairing-friendly elliptic curve resistant to NFS variants, for an embedding degree between 5 and 8.

2019   **Verifiable Delay Functions from Supersingular Isogenies and Pairings**, *(Asiacrypt 2019)*, with L. De Feo and Antonio Sanso.

Construction of verifiable delay functions based on pairings and computation of isogenies defined over $\mathbb{F}_p$ and $\mathbb{F}_{p^2}$.

2018   **Efficient four-dimensional GLV curve with high security**, with Olivier Bernard and Renaud Dubois.

Construction of an elliptic curve allowing dimension 4 GLV decomposition for a high security. The curve has been patented.