

## About

34 years old  
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## Language

French ★★★★★  
English ★★★★★  
Dutch ★★★★★  
German ★★★★★  
Spanish ★★★★★  
Japanese ★★★★★

## OS Preference

Debian ★★★★★  
WSL ★★★★★  
MacOs ★★★★★  
Windows ★★★★★

## Activities

Ballroom Dancing  
Photography  
Piano  
Rock climbing  
Martial Arts  
Sailing

# Benoît Viguiier

PHD. · SOFTWARE ENGINEER

I defended my PhD thesis on December 13<sup>th</sup>, 2021.

I am passionate about symmetric cryptography, formal methods, and beautiful code.  
I am also a competitive ballroom dancer and a photographer.

## Education

### PhD in Cryptography & Formal Methods

Nijmegen, The Netherlands

RADBOD UNIVERSITEIT

Sept. 2016 – Dec. 2021

### Software Engineer

Rennes, France

INSA (NATIONAL INSTITUTE OF APPLIED SCIENCES)

Sept. 2014 – 2016

### MRes. in Computer Science

Rennes, France

UNIVERSITY RENNES 1

Sept. 2015 – 2016

### MSc. in Mathematics

Rennes, France

UNIVERSITY RENNES 1

Sept. 2006 – 2011

## Skills

**Programming** C/C++, Coq, Java, Python, RISC-V asm, ARM Asm, PHP,  $\text{\LaTeX}$

**Dev. Env.** Visual Studio Code, IntelliJ IDEA, Clion, PhpStorm, Git, Atom

## Experience

### Information Security Expert – DevOps Eng. Crypto.

Amsterdam, The Netherlands

ABN AMRO BANK

Apr. 2021 – current

- Designing and implementing the Registration Authority of a Public Key Infrastructure
- Centralization and management of the Bank certificates.

Java, PKI, Scrum, Azure functions

### PhD Candidate

Nijmegen, The Netherlands

RADBOD UNIVERSITY

Sep. 2016 – Feb. 2021

- Designing symmetric cryptography algorithm.
- Writing optimized implementation for lightweight schemes.
- Using formal methods to verify cryptographic C implementations.

Coq, Formal Approaches, Cryptanalysis, C, Assembly

### Internship : Software Engineer & Researcher

Brussels, Belgium

STMICROELECTRONICS

Feb. – Jun. 2016

- Verification of the truncated tree search using Formal Methods.
- Application to differential and linear trail search.

Coq, C++, Cryptanalysis, Hash functions

### Mathematics Teacher

2011 – 2014

- Junior Highschool and Highschool

Teamwork, teaching skills, formalism

## Publications

### A Panorama on Classical Cryptography

Nijmegen, The Netherlands

PHD THESIS

Dec. 2021

Designing, Implementing, Breaking, Verifying, and Standardizing Cryptography

- In this thesis we cover a large part of the classical cryptography world: we examine the design of new symmetric primitive; we explore implementation strategies of lightweight schemes; we analyze a new high performance algorithm; we use formal verification to prove the correctness of Elliptic Curve Cryptography implementations; and finally we describe one of the way algorithms are standardized.

### A Coq proof of the correctness of X25519 in TweetNaCl

Dubrovnik, Croatia

34TH IEEE COMPUTER SECURITY FOUNDATIONS SYMPOSIUM

Jun. 2021

- We formally prove that the C implementation of the X25519 key-exchange protocol in the TweetNaCl library correctly implements the protocol from Bernstein's 2006 paper, as standardized in RFC 7748, as well as the absence of undefined behavior. We also formally prove that X25519 is mathematically correct, i.e., that it correctly computes scalar multiplication on the elliptic curve Curve25519. The proofs are all computer-verified using Coq.

### Assembly or Optimized C for Lightweight Cryptography on RISC-V?

Vienna, Austria

CRYPTOLOGY AND NETWORK SECURITY

Dec. 2020

- In this work, we studied the general impact of optimizing symmetric-key algorithms in assembly and in plain C on RISC-V architectures. Additionally, we present optimized implementations of NIST's lightweight candidates, with speed-ups of up to 81% over available implementations, and discuss general implementation strategies.

### Cryptanalysis of MORUS

Brisbane, Australia

ADVANCES IN CRYPTOLOGY – ASIACRYPT 2018, LNCS

Dec. 2018

- We present a linear correlation in the keystream of full MORUS, which can be used to distinguish its output from random and to recover some plaintext bits in the broadcast setting.

### KangarooTwelve: fast hashing based on Keccak-p

Leuven, Belgium

APPLIED CRYPTOGRAPHY AND NETWORK SECURITY – ACNS 2018, LNCS

July 2018

- KangarooTwelve, a fast and secure arbitrary output-length hash function aiming at a higher speed than the FIPS 202's SHA-3 and SHAKE functions.

### Gimli: A Cross-Platform Permutation

Taipei, Taiwan

CRYPTOGRAPHIC HARDWARE AND EMBEDDED SYSTEMS – CHES 2017, LNCS

Sept. 2017

- Gimli, a 384-bit permutation designed to achieve high security with high performance across a broad range of platforms.

## Extra Activities

### Standard Ballroom & Formation Dancer

The Netherlands

MEMBER OF DSV SWAY OF LIFE

Mar. 2018 - PRESENT

- |                                      |   |                |
|--------------------------------------|---|----------------|
| • 2022 — <b>5<sup>th</sup> place</b> | — World Championship in Formation Dancing       | — Braunschweig |
| • 2022 — <b>3<sup>rd</sup> place</b> | — European Championship in Formation Dancing    | — Nürnberg     |
| • 2022 — <b>Semi-Finalist</b>        | — Dutch Championship in couple A-class Standard | — Steenwijk    |
| • 2021 — <b>2<sup>nd</sup> place</b> | — Dutch Championship in couple C-class Standard | — Dalfsen      |
| • 2021 — <b>1<sup>st</sup> place</b> | — Dutch Championship in Formation Dancing       | — Rotterdam    |
| • 2020 — <b>4<sup>th</sup> place</b> | — Dutch Championship in couple C-class Standard | — Dalfsen      |
| • 2019 — <b>1<sup>st</sup> place</b> | — Dutch Championship in Formation Dancing       | — Almere       |
| • 2019 — <b>Finalist</b>             | — World Championship in Formation Dancing       | — Moskow       |
| • 2018 — <b>1<sup>st</sup> place</b> | — Dutch Championship in Formation Dancing       | — Almere       |

### Landscapes & Ballroom Photography

The Netherlands

PHOTOGRAPHER

Jul. 2018 - PRESENT

- Landscapes & long exposures
- Ballroom Photography – WDSF, NADB, NTDS, ETDS
- Events – PhD Defenses
- Portraiture

### LycheeOrg

The Netherlands

MAIN DEVELOPER & ADMINISTRATOR

Aug. 2018 - PRESENT

- Complete rewrite of the Lychee image server with Laravel.