Natalia KHARCHENKO

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EDUCATION

Sorbonne Université *2016 – 2020*
Laboratoire d'Informatique de Paris 6 (LIP6), ALMASTY team.
PhD Thesis: Lattice algorithms and lattice-based cryptography.
Supervisor: Antoine JOUX.
Defence date: May 27, 2020

Moscow Institute of Physics and Technology *2010 – 2016*
Department of Control and Applied Matematics

Master (with distinction) in Applied Matematics and Physics: Research and development of code deobfuscation methods.
Supervisor: Arutyun AVETISYAN.

Bachelor Thesis: Research and development of code obfuscation methods against dynamic analysis.
Supervisor: Arutyun AVETISYAN.

EMPLOYMENT

Inarix *January 2021 – present*
Data Scientist

Inarix is a computer vision start-up that develops a mobile application for the quality analysis of cereals using photos from smartphone. I am currently a member of the Inarix R&D team.

- maintainance and developement of the computer vision architecture for grain detection and classification, machine learning experiments
- design and implementation of data visualisation tools

PROFESSIONAL ACTIVITIES

Institute for System Programming of Russian Academy of Science *2013 – 2016*
Intern, Compiler Technology Department

Bachelor and Master internship topics: code obfuscation and deobfuscation techniques.
Member of the team developing the ISP RAS's LLVM-based obfuscation compiler.

- design and developement of the control flow obfuscation techniques against dynamic analysis
- static and dynamic analysis of code from big open source projects in order to design obfuscation transformations that mimic the behavior of real programs
- design and developement of deobfuscation tools using symbolic execution

Institute of Information Science, Academia Sinica, Taiwan *October – November 2017*
Research visit

Internship topic: quantum cryptography and quantum speed-ups for lattice sieving algorithms. Under the supervision of Kai-Min CHUNG.

PUBLICATIONS

On a hybrid approach to solve binary-LWE (with Thomas Espitau and Antoine Joux) INDOCRYPT 2020. [eprint] [YouTube talk]

Lattice algorithms and lattice-based cryptography. PhD thesis, 2020. [HAL] [Youtube talk]

TALKS

Discrete Gaussian sampling and lattice-based cryptography. Seminar of Poncelet Laboratory, Moscow, December 2016.

Sieving algorithms for solving hard lattice problems. Seminar of Computational Theory and Algorithms Laboratory Group of Academia Sinica, Taiwan, November 2017.

TEACHING ACTIVITIES

Mini-course on number theory, summer 2014. Summer Ecological School, Mathematical Department.

Mini-course on theoretical foundations of cryptography, summer 2014. Summer Ecological School.

Mathematics and Physics teacher at MIPT's correspondence school, 2011-2012.

MISCELLANEOUS

Post-Scryptum workshop participant, March 2018.

Referee for PKC and PQCrypto conferences.

PROGRAMMING LANGUAGES

C, C++, Python

SKILLS, KEYWORDS

Git, LaTeX

LLVM

Compilers, Cryptography, Machine Learning, Computer Vision

LANGUAGES

Russian — native

English — fluent (IELTS 7.5, 2014)

French — conversational