

Bartłomiej Szkodny

STUDENT
KATOWICE

CONTACT

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LANGUAGES

Polish: native (C2)
English: advanced (C1)

TECHNICAL SKILLS

- Operating systems: Linux (Ubuntu, Arch), Windows
- Programming languages: Python, C++, Verilog
- Currently learning: UVM
- Tools: Git, Quartus, Vivado

PROFILE

M.Sc. Computer Science student who implemented a lattice-based post-quantum encryption core in Verilog HDL, verified bit-exact against a Python golden-reference model. Comfortable across the stack – from FPGA logic and AXI-driven peripheral cores on a Zynq-7020 SoC to Python automation scripts on Linux (Ubuntu, previously Arch). Currently shifting focus from software automation toward hardware design and verification research, and building UVM skills along the way.

EDUCATION

Silesian University of Technology, Faculty of Automatic Control, Electronics and Computer Science

Informatics, B.Sc. studies (2022 – 2026)

Microinformatics of Digital Systems (Intel-partnered program), M.Sc. studies (2026 – Present)

EXPERIENCE AND PROJECTS

Quantum-resistant cryptography – FPGA hardware implementation (Engineering thesis), Gliwice
Designed and implemented a lattice-based (LWE) encryption/decryption core on FPGA:

- **Algorithm selection**: compared PQC families (lattice-, code-, hash-, multivariate- and isogeny-based) against NIST standardization criteria and picked LWE for its security/efficiency trade-off.
- **Hardware design**: wrote the encryption and decryption cores in Verilog HDL, eliminating hardware dividers by choosing a power-of-two modulus (bitmask-based modular reduction) and cutting DSP usage by replacing matrix multiplication with conditional accumulation on a binary vector.
- **Verification**: built a Python golden-reference model and a co-simulation flow (ModelSim testbenches, `$readmemh`-driven vectors) that confirmed bit-exact encryption and decryption of multi-character ASCII test messages.

TM1637 LED display driver on Zynq-7020
Implemented a pseudo-I2C communication core in FPGA fabric on a Xilinx Zynq-7020 SoC to drive a TM1637 LED display/keyboard-scan chip, with the processing system issuing commands to the core over an AXI interface.

Travelling Salesman Problem solver (C++)
Designed a genetic-algorithm-based solver in C++, implementing crossover and inheritance operators so candidate routes evolve from their parents across generations.

Student research clubs – Biotechnology Centre, Silesian University of Technology
Worked extensively in student research clubs and research projects, mainly as a programmer developing automation software for manufacturing processes under the university's Biotechnology Centre.