

Nicolas Badoux

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CH—Switzerland
Swiss citizen—married
Born 06.11.1994

EDUCATION	Doctor of Sciences (PhD) <i>École Polytechnique Fédérale de Lausanne (EPFL) - Switzerland</i> - Advisor: Prof. Mathias Payer in the HexHive laboratory. - Thesis: Securing low-level code with minimal developer efforts. - Topics: System security, software testing, compiler-based defenses, fuzzing.	2020–2025
	Master of Science ETH in Computer Science <i>Eidgenössische Technische Hochschule Zürich (ETHZ) - Switzerland</i> - Specialization in Information Security, GPA: 5.39/6.	2016–2019
	Bachelor in Communication Sciences <i>École Polytechnique Fédérale de Lausanne (EPFL) - Switzerland</i> - Exchange program @ Carnegie Mellon University - USA, GPA: 5.26/6.	2013–2016 2015–2016
	Bilingual Matura (German/French) <i>Kantonschule Frauenfeld & Gymnase d'Yverdon - Switzerland</i> - Specialization in Mathematics and Physics, GPA: 5.19/6, Best 3%.	2010–2013

RESEARCH	type++: prohibiting type confusion with inline type information	NDSS'25
EXPERIENCE	Authors: Nicolas Badoux, Flavio Toffalini, Yuseok Jeon, & Mathias Payer. - <i>Distinguished Paper Award</i> (top 5%). - In C++, incorrect downcast are a severe vulnerability often exploited in the wild. - By inlining the type in each C++ object, we create a compiler-based mitigation against type confusion attacks allowing downcast to be checked at runtime while requiring minimal code adaptations. We evaluate our prototype against the state-of-the-art and achieve less than 1% runtime overhead while protecting 90B casts. We deploy our prototype on Chromium. - Built on top of LLVM, type++ is available on GitHub and its artifact evaluated.	
	libErator: Balancing library fuzzing without consumer code Authors: Flavio Toffalini, Nicolas Badoux, Zurab Tsinadze, & Mathias Payer. - Drivers, a sequence of API calls building state, allows for dynamic testing like fuzzing, to execute a library's code. Manually written drivers are rare and exhaustively tested. - LIBERATOR automates the generation of fuzzing drivers without consumer code and allow for balancing resources between driver generation and fuzzing. - From insights gathered through LLVM passes, we build valid C drivers calling the API. - We report and fix 24 bugs, including CVE-2024-8006. We release our prototype on Github .	FSE'25
	Sourcerer: channeling the void Authors: Nicolas Badoux, Flavio Toffalini, & Mathias Payer. - In C++, conversions from <code>void*</code> to typed pointers are ubiquitous but, if the type is not the original one, lead to type confusions and possibly further memory corruption. - By extending the protection of type++ to all the types used in casts, we design Sourcerer, a complete type confusions sanitizer. With a low-overhead of 5% on average, we conduct the first fuzzing campaign targeting specifically type confusions. - We find type confusions in Blender and OpenCV and release our prototype on GitHub .	DIMVA '25
	Bypassing LLVM-CFI cast protection Authors: Nicolas Almerge, Nicolas Badoux, & Mathias Payer. - We present a novel attack against LLVM-CFI, bypassing the cast protection for C++. - As the main advisor for this Master project, I laid out the research plan, provided guidance, and reviewed the results.	Ongoing

INDUSTRY **Software Engineer** - Fondation Digger, NGO - Tavannes, CH *Aug' 2019–March 2020*
EXPERIENCE - Developed a virtual overlay for remotely removing explosives with the help of OpenCV and Unity in an Agile environment as part of my civil service.

Software Engineer - Compassion Suisse, NGO - Yverdon, CH *Mar'–May 2018*
- As part of my civil Service, contributed to open source Python modules for the Odoo ERP.

Security Engineer Intern - Ergon Informatik - Zürich, CH *60%—Sept' 2017–Mar' 2018*
- Developed a blackbox fuzzer in Python to find bugs in Ergon's Web Application Firewall.

Technology Summer Analyst - Morgan Stanley - London, UK *June–Aug' 2016*
- Developed charts in AngularJS for statistics of the Architecture Security team.

SKILLS **Programming Languages:** Python, C++, L^AT_EX, Bash.

Software: LLVM, Docker, GDB, Linux, libfuzzer.

Spoken Languages: French (native), English, Swiss-German, German.

TEACHING **CS-119 Information, Calcul & Communication** *2022 & 2024*

ASSISTANT **CS-323 Operating System** *2021*

CS-412 Software Security *2021 & 2023*

COM-402 Information Security & Privacy *2023*

ACTIVITIES **Board Member, Treasurer** - Groupes Bibliques des Écoles et Universités *2023–present*
- Define the vision, hiring of the general secretary, and budget planning (\simeq 500kCHF).

Camp Leader - Interjeunes & Ligue pour la Lecture de la Bible *2014, 2017, 2021, 2022*
- Lead camps with up to 110 kids/young adults for a week. Built a team, prepared the event, managed the team and was in charge of the authority during the week.

REFERENCES **Prof. Dr. Mathias Payer** *mathias.payer@nebelwelt.net*
- Associate Professor at EPFL in Lausanne (CH) and head of HexHive.
- Advised me during my PhD between 2020 and 2025.

Prof. Dr. Flavio Toffalini *flavio.toffalini@rub.de*
- Assistant Professor at Ruhr-Universität in Bochum (DE).
- Close collaborator and advising post-doc during my PhD (2021–2025).

Benoît Pfister *benoit.pfister@gbau.ch*
- Chairman of the Board at Groupes Bibliques des Écoles et Universités.
- We worked together for hiring committees, budgeting, and general strategy.