Cezar-Constantin Andrici

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I'm a Ph.D. candidate at MPI-SP, Bochum, Germany working with Cătălin Hriţcu. My research focuses on building the first secure compiler for verified code, by developing a secure compiler from the proof-oriented programming language F* to OCaml. Existing (insecure) compilers erase all the assumptions under which the code was verified, thus, making the resulting compiled code vulnerable when linked against adversarial code. To fix this, a secure compiler exploits available mechanisms to enforce the assumptions. In our most recent paper at POPL'24, we present a secure compiler for verified IO programs that converts the assumptions into dynamic checks.

1 Skills

Proven experience with functional programming, dependently-typed languages, formal verification, interactive theorem proving, and automated reasoning using SMT solving.

Proficient in $F^\star$, JavaScript, Python, Dafny and SQL. Knowledgeable with C, OCaml, Solidity.

Past experience with Linux-based platforms, containerization and cloud services.

2 Education

10/2021–
09/2025
(expected)
Ph.D. candidate in Computer Science at the Max Planck Institute for Security and Privacy (MPI-SP) in Bochum, Germany working with Cătălin Hriţcu on the subject of *Secure interoperability between $F^\star$ and ML*

2019 – 21 **M.Sc.** in Computer Science from Alexandru Ioan Cuza University of Iași, Romania

2019 – 21 **MA** in Regional Development from Alexandru Ioan Cuza University of Iași, Romania

2015 – 19 **B.Sc.** in Computer Science from Alexandru Ioan Cuza University of Iași, Romania

3 Publications

1. **Securing Verified IO Programs Against Unverified Code in $F^\star$**. *Cezar-Constantin Andrici*, Ștefan Ciobâcă, Cătălin Hriţcu, Guido Martínez, Exequiel Rivas, Éric Tanter and Théo Winterhalter. *To appear at the 51st ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2024). The artifact received the Functional and Reusable badges.*

2. **Who Verifies the Verifiers? A Computer-Checked Implementation of the DPLL Algorithm in Dafny.** *Cezar-Constantin Andrici* and Ștefan Ciobâcă. In *Mathematics 2022*, 10(13), 2264.

3. **Verifying non-terminating programs with IO in $F^\star$ (Extended Abstract)**. *Cezar-Constantin Andrici*, Théo Winterhalter, Cătălin Hriţcu and Exequiel Rivas. At the 10th ACM SIGPLAN Workshop on Higher-Order Programming with Effects (HOPE 2022). Slides. Video.

4. **Partial Dijkstra Monads for All (Extended Abstract)**. Théo Winterhalter, *Cezar-C. Andrici*, Cătălin Hriţcu, Kenji Maillard, Guido Martínez and Exequiel Rivas. At the 28th International Conference on Types for Proofs and Programs (TYPES 2022).

4 Research & Industry Experience

Research intern at [UAIC](), Iași (from Feb 2020 to Jun and from Nov to Jul 2021)
➢ Implemented a [DPLL Solver in Dafny]() and fully verified the functional correctness of the solver by constructing machine-checked proofs of its soundness, completeness, and termination using first-order logic and SMT solving.
➢ Working with [Ștefan Ciobâcă]()

Research intern at [MPI-SP](), Bochum, Germany (Jul 2020 to Oct 2020)
➢ Research on secure F*-ML interoperability for IO programs.
➢ Working with [Cătălin Hriţcu]()

Research intern at [Inria Paris](), France (Jul 2019 to Nov 2019)
➢ Conducted a case study on using Dijkstra Monads in the F* language to give semantics and verify propositional trace properties of IO programs using higher-order logics and SMT solving.
➢ Working with [Cătălin Hriţcu]() and [Exequiel Rivas]()

IT Specialist at [UAIC](), Iași, Romania (Dec 2017 to June 2019)
➢ Built a new main website for the Faculty of Computer Science (still in use).

Full Stack Developer and Team Leader at CTF365, Cluj, Romania (Nov 2015 to Nov 2017)
➢ CTF365 was a security startup - the main product was a security training platform that attracted several Fortune 500 companies as clients.
➢ Obtained a pre-seed round of investment from [hub:raum -Tech Incubator of Deutsche Telekom]() after participating in a 5-week program in Krakow, Poland.
➢ Coordinated the technical team, created software solutions, managed full life-cycle software development, performed technical analysis and testing, led technical collaboration, and wrote technical documentation.

Software Development Intern at [Amazon Development Center](), Iași, Romania (Jul 2015 to Oct 2015)
➢ Built a single-page application that used AWS IAM for authentication, AWS Lambda to create PDFs, and AWS S3 for storage. The application was hosted on AWS S3.

5 Awards & Grants

1st prize at Student Research Competition, graduates section, at the 25th ACM SIGPLAN International Conference on Functional Programming (ICFP 2020) with submission: Gradual Enforcement of IO Trace Properties.

Travel grant to participate in VMCAI Winter School, New Orleans, 2020.

Scientific performance scholarship from [UAIC](), Iași, Romania. The scholarship was for 12 months and it was competitively awarded.

During high school, I **participated in the National Computer Science Olympiad** in

Romania in 2008, 2009, 2011 and 2012. Ranked top 15 every year. Also, participated in the National Computer Science Olympiad from Bulgaria in 2009.

Numerous awards at contests of IT&C projects (e.g., InfoEducație), at local hackathons and events of entrepreneurship (e.g., Startup weekend).

Travel grants for *Leonardo da Vinci Lifelong Learning Programme*, Karlsruhe, Germany, 2012 and *Euroscola Programme*, Strasbourg, France, 2014. The travel grants were competitively awarded.

6 Presentations

- **Securing Verified IO Programs Against Unverified Code in F⋆** at the F* PoP Up Seminar (July 2023) - video.
- **Gradual Enforcement of IO Trace Properties** at Student Research Competition, 25th ACM SIGPLAN International Conference on Functional Programming (ICFP 2020), online (Aug 2020) - video.
- **Verification of IO behavior of programs in F⋆** at Faculty of Computer Science Seminar, Iași (Jan 2020).

7 Community Service

Sub-reviewer at

- 51st ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2024)
- 42nd IEEE Symposium on Security and Privacy (SP 2021)

Member in Artifact Evaluation Committee at

- 50th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2023)

Student Volunteer at

- 47th, 50th and 51st ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2020, 2023 and 2024);
- 27th ACM SIGPLAN International Conference on Functional Programming (ICFP 2022);
- 41st ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2020);
- European Joint Conferences on Theory and Practice of Software (ETAPS 2019);
- Working Formal Methods Symposium (FROM 2018).

Judge in the national committee for the National Contest InfoEducație for pupils between 2016 and 2020, Romania. (pupils develop and present web or mobile apps)

8 Attended Summer Schools

- [The Cornell, Maryland, Max Planck Pre-doctoral Research School 2020 (online)](#)
- [Verification, Model Checking, and Abstract Interpretation (VMCAI) Winter School 2020 (USA, New Orleans)](#)
- [POPL Programming Languages Mentoring Workshop 2020 (USA, New Orleans)](#)
- [ETAPS Mentoring Workshop 2019 (Czech Republic, Prague)](#)
- ICUB - Coq Autumn School 2018 (Romania, Bucharest)

9 Languages

Romanian (Native), **English** (Proficient user), **German** (beginner)

10 References

Cătălin Hrițcu Tenured faculty at MPI-SP, Bochum, Germany - catalin.hritcu@mpi-sp.org

Éric Tanter Full Professor at University of Chile - etanter@dcc.uchile.cl

Ștefan Ciobâcă Associate Professor at UAIC, Iași, Romania - stefan.ciobaca@gmail.com