Mikhail R. Gadelha

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Summary

A results-driven Software Engineer with over a decade of experience in systems development and a PhD in Computer Science. Key qualifications include:

- Deep expertise in program verification, compilers, and formal methods, with over 20 published papers.
- Proven contributor to major open-source projects, including LLVM/Clang, WebKit, and ESBMC.
- Specialized in static analysis, model checking, and performance optimization for RISC-V architectures.

Technical Skills

Programming Languages: C++, C, Python

Tools & Technologies: LLVM, Clang, WebKit, RISC-V

Specializations: Program Verification, Compilers, Static Analysis, Model Checking, Formal Methods

Open Source Projects

ESBMC — Core Contributor and Maintainer
SMT-based Bounded Model Checker — *C++, SMT Solvers*

- Core contributor and maintainer of ESBMC verification tool
- Enhanced model checking capabilities for C++ programs

LLVM/Clang — Committer
Compiler Infrastructure — *C++, RISC-V*

- Maintainer of RISC-V libc port
- Focus on RISC-V application performance optimization

Camada — Developer
C++ SMT Solver Wrapper Library — *C++, SMT Solvers*

- Unified API wrapper for multiple SMT solvers (Z3, Boolector, STP, Yices, MathSAT, CVC5)
- Enables seamless solver switching without code modification
- Based on ESBMC backend with floating-point and array encoding capabilities

Experience

Software Engineer — May 2021 – Present
Igalia — *Remote*

- Developed the initial port of the LLVM libc to RISC-V, establishing full support for both 64-bit and 32-bit architectures.
- Led an 8-month RISC-V optimization initiative that delivered significant performance gains.
- Drove improvements across WebKit, including 32-bit JIT compilation, WebAssembly validation, security hardening, and modernizing IPC serialization.

Technical Specialist — Feb 2019 – Apr 2021
Sidia Instituto de Ciência e Tecnologia — *Manaus, Brasil*

- Engineered novel algorithms to automate theme verification for Android applications, significantly reducing manual effort.
- Designed and implemented neural network-based methods for photorealistic style transfer.
- Managed multiple software development projects, overseeing teams of engineers and ensuring on-time delivery.

Developer Apr 2018 – Aug 2018
Google Summer of Code *Remote*

- Implemented a new refutation manager for the Clang static analyzer, leveraging the Z3 SMT solver to improve bug detection accuracy.
- Created an enhanced SMT encoding and constraint generation system, boosting the precision of the static analysis.

Software Engineer Jun 2013 – May 2018
FUCAPI *Manaus, Brasil*

- Built and deployed automated testing systems for both Windows and Linux notebook production lines.
- Partnered with Semp Toshiba to design and implement customized automated testing solutions.
- Acted as Scrum Master, facilitating agile development processes for multiple engineering teams.

Software Engineer Nov 2011 – May 2013
Ceteli *Manaus, Brasil*

- Served as the lead developer on the ESBMC project in a key collaboration with the Nokia Institute of Technology.
- Managed development workflows and source control (Git/SVN) as Scrum Master for the project team.
- Pioneered new software verification tools and methodologies that were adopted by the project.

Education

PhD in Computer Science Feb 2015 – Dec 2018
University of Southampton *Southampton, UK*

- Thesis: Available at https://eprints.soton.ac.uk/433530/
- Research focus: Program Verification, Compilers, Formal Methods

MSc in Electrical Engineering 2011 – 2013
Universidade Federal do Amazonas *Manaus, Brasil*

BSc in Telecommunications Engineering 2006 – 2010
Fucapi *Manaus, Brasil*

BSc in Computer Engineering 2006 – 2010
Universidade Federal do Amazonas *Manaus, Brasil*