

# ANDRES NÖTZLI

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## EDUCATION

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- PhD Candidate in Computer Science** 2014–Present  
Advised by Prof. Clark Barrett  
STANFORD UNIVERSITY
- Master degree in Computer Science** 2012  
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE
- Bachelor degree in Computer Science** 2010  
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE  
CARNEGIE MELLON UNIVERSITY (exchange year, 2009–2010)

## PROFESSIONAL EXPERIENCE

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- PhD Internship** 2019  
The goal of the internship was to improve the performance of an existing tool for formally analyzing access policies. I worked on a benchmarking framework, improved the core algorithm, and devised an efficient algorithm to determine regular expression inclusion for a relevant fragment of regular expressions.  
AUTOMATED REASONING GROUP (ARG) AT AMAZON AWS
- PhD Internship** 2015  
Contributed to RocksDB (<http://www.rocksdb.org/>), an open source persistent key-value store.  
FACEBOOK
- Scientific Assistant** 2012–2014  
Worked on multiple research projects, most notably DBToaster (<http://www.dbtoaster.org/>).  
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE
- Internship** 2011–2012  
Implemented tools and helped with project management for a major project for the Swiss government.  
EXANOVIS AG
- Quality Assurance for Medical Software** 2008–2009  
Part-time. Reproduced reported bugs, enhanced bug reports, tested bug fixes.  
QUALIDOC

## AWARDS AND HONORS

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- Excellence Fellowship** 2010  
Fellowship at the Master level for students with outstanding academic records  
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

**Dean's List** 2009 –2010  
QPA of 3.75 or higher, Fall 2009 and Spring 2010 Semester  
CARNEGIE MELLON UNIVERSITY

**Prix Cousin** 2008  
Best general average for the first year  
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

## ACTIVITIES

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**Subreviewer for Conferences and Workshops**  
VSTTE 2019, CADE 2019, SAT 2019, CAV 2019, CADE 2017

## OPEN SOURCE CONTRIBUTIONS

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**CVC4** (<https://github.com/CVC4/CVC4>) 2016–Present  
Core author (over 300 commits and 500 code reviews). Primarily working on the theory of strings, general rewriting/preprocessing, proof/unsat cores infrastructure, and general maintenance. Significant involvement in the preparations for SMT-COMP 2017, 2018, and 2019.

**p4pktgen** (<https://github.com/p4pktgen/p4pktgen>) 2017–2018  
Main author. Primarily worked on the implementation of translating paths to SMT constraints, general design.

**LifeJacket** (<https://github.com/4tXJ7f/alive>) 2016  
Fork of Alive (<https://github.com/nunoplopes/alive>), extends the original project with support for floating-point optimizations.

**Z3** (<https://github.com/Z3Prover/z3>) 2016  
Bug and documentation fixes.

**RocksDB** (<http://www.rocksdb.org/>) 2015  
Implemented a major feature during the internship (tombstone deletion), several bug fixes and minor features.

## PUBLICATIONS

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**High-Level Abstractions for Simplifying Extended String Constraints in SMT** 2019  
Andrew Reynolds, Andres Nötzli, Clark Barrett, Cesare Tinelli  
INTERNATIONAL CONFERENCE ON COMPUTER-AIDED VERIFICATION (CAV)

**CVC4SY: Smart and Fast Term Enumeration for Syntax-Guided Synthesis** 2019  
Andrew Reynolds, Haniel Barbosa, Andres Nötzli, Clark Barrett, Cesare Tinelli  
INTERNATIONAL CONFERENCE ON COMPUTER-AIDED VERIFICATION (CAV)

**Syntax-Guided Rewrite Rule Enumeration for SMT Solvers** 2019  
Andres Nötzli, Andrew Reynolds, Haniel Barbosa, Aina Niemetz, Mathias Preiner, Clark Barrett, Cesare Tinelli  
INTERNATIONAL CONFERENCE ON THEORY AND APPLICATIONS OF SATISFIABILITY TESTING (SAT)

**Towards Verified, Constant-time Floating Point Operations** 2018  
Marc Andryscio, Andres Nötzli, Fraser Brown, Ranjit Jhala, Deian Stefan  
COMPUTER AND COMMUNICATIONS SECURITY (CCS)

- p4pktgen: Automated Test Case Generation for P4 Programs** 2018  
 Andres Nötzli, Jehandad Khan, Andy Fingerhut, Clark Barrett, Peter Athanas  
 ☆ Best short paper  
 SYMPOSIUM ON SDN RESEARCH (SOSR)
- EmptyHeaded: A Relational Engine for Graph Processing** 2017  
 Christopher R. Aberger, Andrew Lamb, Susan Tu, Andres Nötzli, Kunle Olukotun, Christopher Ré  
 TRANSACTIONS ON DATABASE SYSTEMS (TODS)
- LifeJacket: Verifying Precise Floating-Point Optimizations in LLVM** 2016  
 Andres Nötzli, Fraser Brown  
 INTERNATIONAL WORKSHOP ON THE STATE OF THE ART IN JAVA PROGRAM ANALYSIS (SOAP@PLDI)
- How to Build Static Checking Systems Using Orders of Magnitude Less Code** 2016  
 Fraser Brown, Andres Nötzli, Dawson Engler  
 ARCHITECTURAL SUPPORT FOR PROGRAMMING LANGUAGES AND OPERATING SYSTEMS (ASPLOS)
- DBToaster: Higher-order Delta Processing for Dynamic, Frequently Fresh Views** 2014  
 Christoph Koch, Yanif Ahmad, Oliver Kennedy, Milos Nikolic, Andres Nötzli, Daniel Lupei, and Amir Shaikhha  
 THE VLDB JOURNAL
- Automatic Synthesis of Out-of-Core Algorithms** 2013  
 Yannis Klonatos, Andres Nötzli, Andrej Spielmann, Christoph Koch, and Viktor Kuncak  
 SIGMOD

## POSTERS, DEMOS, AND TALKS

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- p4pktgen: Automated Test Case Generation for P4 Programs (Demo)** 2018  
 Andres Nötzli, Jehandad Khan, Andy Fingerhut, Clark Barrett, Peter Athanas  
 P4 WORKSHOP
- LifeJacket: Verifying Precise Floating-Point Optimizations in LLVM (Talk)** 2017  
 Andres Nötzli, Fraser Brown  
 ☆ Won third place  
 Student Research Competition at the EUROPEAN LLVM DEVELOPERS MEETING
- Proofs for Preprocessing in SMT Solvers (Poster)** 2016  
 Andres Nötzli  
 Student Forum at FMCAD

## TECHNICAL EXPERTISE

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- ❖ Deep understanding of the design and implementation of SMT solvers, databases, compilers, and operating systems
- ❖ Programming languages: C++ (advanced), Python (advanced), C (intermediate), Java (intermediate), Scala (intermediate), Haskell (intermediate), x86 assembly (basic)
- ❖ Experience with development for mobile platforms (Android)
- ❖ Familiar with tools for revision control (Git, SVN), continuous integration (Travis CI), and scientific writing (LaTeX)