GeorgeKarpenkov

george@metaworld.me

interests and skills

- software engineering
- formal methods
- LLVM
- compilers
- TensorFlow
- XLA
- verification
- convex optimization
- machine learning

programming languages

Proficient:
Java, Python, C++

Confident:
JavaScript, C, PHP

Some Experience:
Bash, OCaml, Haskell

languages

English, Russian, French

references

available upon request

misc

github.com/cheshire

Citizenship Australian

experience

2019 - Now **Google Brain, Mountain View, USA** — Software Engineer
Working on compilers on machine learning, mainly XLA:CPU, XLA:GPU, and TensorFlow-XLA integration.
- Leading the project for XLA integration in tf.function.
- Implemented fast deterministic reduction emitter for XLA:GPU.

2017 - 2019 **Apple Inc, Cupertino, USA** — Program Analysis Software Engineer
Working mainly on Clang Static Analyzer and libFuzzer. Some highlights:
- Integrated libFuzzer into Clang toolchain, which enabled the creation of `-fsanitizer=fuzzer` flag.
- Added libFuzzer support for Swift.
- Rewrote the exploration order of Clang Static Analyzer, getting 20% increase in number of bugs found.
- Mentored the GSoC project for cross-checking analyzer reports using Z3, getting 10% increase in precision.
- Gave a WWDC talk on Clang Static Analyzer.

2013 - Now **VERIMAG Laboratory, Grenoble, France** — Contract PhD Student
Developing methods for automated software verification and bug finding. Projects I work on include:
- Created LPI (lpi.metaworld.me) software analysis tool which took the first place in the "Loops" sub-category of the international competition on software verification.
- CPAchecker (cpachecker.sosy-lab.org), a collaboratively developed open-source tool for automated software verification and bug-finding.
- Created JavaSMT (github.com/sosy-lab/java-smt) library, a unified API layer for accessing SMT (satisfiability modulo theories) solvers.

2012 - 2013 **Freelancer International Pty Ltd, Sydney, Australia** — Software Engineer
Backend development for the largest online global outsourcing marketplace. I have completed various projects including:
- Designed, implemented and deployed responsive search system for the instant messaging application.
- Did backend development, ranking algorithm, and schema design for the online directory of freelancers (http://freelancer.com/directory/).
- Designed and implemented unified error handler across the main PHP website.

2012 - 2012 **University of Sydney** — Casual Academic Staff
Tutoring "Data Structures" and "Object Oriented Design" (basic of OO design, design patterns, and C++) courses.

2011 - 2011 **Google Australia, Sydney** — Software Engineering Intern
Completed a project involving optimization of the OCR stack and its integration into Google Docs. The result was pushed to production, and scanned PDFs uploaded to Google Docs became searchable.

2010 - 2010 **Cloud Registry, Australia, Sydney** Software Engineer
Participated in the launch phase of the top level domain (TLD) management platform startup. My duties includeded system requirements and design specifications, developing both the application server (Python) and the frontend of the management interface (JavaScript).

2009 - 2012 **The Interaction Consortium, Australia, Sydney** Software Engineer
Web application development using Django framework, both backend and frontend. Participated in creating the websites for Museum of Contemporary Art, Art Gallery of New South Wales and many others. During my work I have contributed to various open source projects including:

- Django ORM for MongoDB (http://github.com/django-nonrel/mongodb-engine).
- A number of accepted patches to Django.
- Smartlinks library: wiki-style links for Django models. Development, API and documentation (http://github.com/ixc/glamkit-smartlinks).

education

2013 - 2017 **VERIMAG Laboratory, Grenoble, France** PhD Student
Research in formal verification.

2008 - 2013 **The University of Sydney** Bachelor of IT (Hons. I), Bachelor of Science (Adv. Math)
Majored in computer science, mathemathics and physics.

awards

2012 **1st place in Australia and New Zealand in ACM International Collegiate Programming Contest** Team Award
Biggest student programming competition in the world.

2008 **Microsoft Research Asia Prize for Junior Software Development Project**
Got awarded the prize for the work of developing the software for the remote-controlled helicopter.

publications

Software Verification with Local Policy Iteration (Competition Contribution)

TACAS, 2016

JavaSMT: A Unified Interface for SMT Solvers in Java

,
VSTTE, 2016

Formula Slicing: Inductive Invariants from Preconditions

,
HVC, 2016

Program Analysis with Local Policy Iteration

,
VMCAI, 2016