

# Kirill Bobyrev

SOFTWARE ENGINEER

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## Summary

Software Engineer with Machine Learning experience working on simulation software for Self-Driving Cars at Waymo.

## Work Experience

### Waymo

Mountain View, California, USA

SOFTWARE ENGINEER

Jun 2022 - Present

- Working on **SimCity**: Waymo's most advanced simulation system for autonomous driving.
- Migrated a critical Neural Network from CPU to TPU and reduced inference latency by 70x.
- Designed, built and deployed a mechanism for heatmap generation for the improved navigation of the autonomous vehicles in simulation.
- Built distributed systems for the efficient data processing in simulation that are working on thousands of distributed nodes.

### Google

SOFTWARE ENGINEER

Nov 2019 - Jun 2022

- Significantly improved **clangd**, Clang-based C++ Language Server Protocol implementation that brings IDE-like experience for Visual Studio Code, Vim, CLion, XCode, a number of other IDEs and text editors.
- Designed and implemented **Include Cleaner: IWYU**-like functionality for warning users about unused and missing headers.
- Implemented **Remote Index service** for LLVM and Chromium. This allows developers with slow machines to get precise code completion and navigation with zero startup time. Deployed the service to Google Cloud and maintained it. The service is handling 1.5M+ requests per week.
- Took responsibilities of Product Manager and UX Researcher: continuously interviewed our users and processed feedback, built feature roadmaps and prioritized tasks based on the needs of our users.

### Handl, Y Combinator-backed Machine Learning startup

DATA SCIENTIST

Feb 2019 - Jun 2019

- Secured a contract with AMG Mercedes Benz, worked out how to translate their business goals into fine-grained technical problems and led the project.
- Built Deep Learning models for a variety of tasks such as Image and Sound Segmentation, Image and Video Classification.
- Contributed to state-of-the-art Deep Learning models for Optical Character Recognition in PyTorch and TensorFlow.

### Google

SOFTWARE ENGINEERING INTERN

Jul 2018 - Sep 2018

- Designed and implemented **Dex** — search index for efficient code completion.
- Replaced previous index implementation and gained **15x-60x performance boost** while offering more features.
- Reduced average code completion latency from 16 ms to 1.09 ms for LLVM codebase (3M Lines Of Code) and from 119 ms to 1.9 ms for Chromium codebase (16M LOC).
- Implemented Variable length Byte (VByte) compression algorithm and reduced memory overhead by 60% with no performance or precision losses.
- Identified performance bottlenecks in LLVM infrastructure and made commonly used serializer 3 times faster.

### Google

SOFTWARE ENGINEERING INTERN

Jun 2016 - Sep 2016

- Elevated the performance of **Clang-Rename**, Clang-based tool that can perform efficient renaming actions in large-scale projects such as renaming classes, functions, variables, arguments, namespaces etc.
- Fixed renaming bugs, added support for template classes, introduced new functionality and gained users for Clang-Rename.
- Built Vim and Emacs plugins for Clang-Rename tool.
- Designed and prototyped **Clang-Refactor**, which later transformed into **Clang's Refactoring Engine**.
- Started a discussion about building Language Server Protocol implementation which later resulted in clangd creation and became the main focus of the team.
- Added new checks to **Clang-Tidy** and reduced false-positive rate for existing ones.

### Google

GOOGLE SUMMER OF CODE STUDENT

Jun 2015 - Sep 2015

Implemented Code Clone Detection tool in Clang Static Analyzer and used it to detect over 400 similar code pieces in Git, Vim, OpenSSL and other projects. The **overview** of key results is hosted on GitHub.

## Talks & Publications

## LLVM Developers' Meeting conference lightning talk

"DEX: EFFICIENT SYMBOL INDEX FOR CLANGD" ([VIDEO RECORDING](#) AND [SLIDES](#))

San Jose, California, USA

2018

## LLVM Developers' Meeting conference poster

"CODE CLONE DETECTION IN CLANG STATIC ANALYZER: DETECTING COPY-PASTE USING STATIC ANALYSIS" ([POSTER](#))

San Jose, California, USA

2015

# Open Source

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## LLVM

CONTRIBUTOR

2015 - Present

Participating in LLVM-related projects and working on Clang-based C++ tooling. This includes contributing to clangd, Clang-Tidy, Clang Static Analyzer and other C++ Language tools. My work has been featured multiple times on [LLVM Weekly](#) covering the most important recent changes. [List](#) of all my commits.

# Skills

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**Programming Languages** C++, Rust, Python

**Expertise** Distributed Systems, Machine Learning, Compilers, Operating Systems, Computer Architecture

**Miscellaneous** Linux, Git, CMake, HTML and CSS,  $\text{\LaTeX}$

# Education

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## Moscow Institute of Physics and Technology

B.S. IN MATHEMATICS AND PHYSICS

Sep 2014 - Jul 2019

Graduated from the best STEM university in Eastern Europe.