

Jianping Zeng

CONTACT INFORMATION	Department of Computer Science at Virginia Polytechnic Institute and State University Blacksburg, VA, USA jpzeng@vt.edu
RESEARCH INTERESTS	My researching interests focus on compiler construction, and I am hooked by various of puzzles in compiler, such as how to find optimal or approximately optimal method to improve efficiency of machine code generated by compiler in different criteria, especially in machine-independently optimization and code generation related to specified target machine.
EDUCATION	<p>Virginia Polytechnic Institute and State University, Blacksburg, VA.</p> <p>Ph.D., Computer Science, 8/2018 to Now.</p> <ul style="list-style-type: none">• Advisor: Changhee Jung, Ph.D <p>HuaZhong university of Science and Technology, Wuhan, Hubei.</p> <p>M.S., Computer science, 9/2014 to 6/2017, Major GPA 3.7</p> <ul style="list-style-type: none">• Thesis Topic: <i>Wireless Fingerprinting Localization based On Partition of Region and Gaussian process regression</i>• Advisor: KeShi, Ph.D <p>JiaXing university, Jiaxing, Zhejiang.</p> <p>B.S., Computer science, 9/2010 to 6/2014, Major GPA 3.7</p> <ul style="list-style-type: none">• Thesis Topic: <i>Design and implementation of Parallel algorithm on multi-cores processor</i>• Advisor: Guangxue Yue, Ph.D <p>Central South university, Changsha, Hunan.</p> <p>Exchange student., Computer science, 9/2012/ to 7/2013</p>
AWARDS	<p>Student Awards — HuaZhong university of Science and Technology</p> <ul style="list-style-type: none">• Academic excellent Award 2014-2017 <p>Student Awards — JiaXing university</p> <ul style="list-style-type: none">• Academic excellent Award 2010-2013• Outstanding Graduates Award May 2014• Second Class prize of Zhe Jiang Province Challenge Cup May 2013

WORK EXPERIENCE	Researching Assistant	Aug 2018 to present
	Compiler Engineer	Dec 2017 to present
	<p>ToolChain group, Hangzhou C-sky system corporation(Platinum member of RISC-V foundation),</p> <p>At C-sky system corporation, I am engaged in improving GCC backend, developing LLVM backend for C-sky CPU and taking responsible for many valuable works, for example, how to implement the semantic of input language (C/C++) with specified machine instruction. In the other hand, I also accomplish some innovative works about figure out properly methods to solve bugs found in GCC backend, lastly, migrating C-sky fork of GCC from reload pass to LRA by default.</p> <p>Since Joining the corporation, I also take charge of the implementation of LLVM backend for C-sky CPU because LLVM have various of advantages, such as license, great scalability and relatively excellent performance. Currently, Our team are making process of this project.</p>	
	Software Engineer	June 2017 to Dec 2017
	<p>Taobao BU, Alibaba group,</p> <p>I have finished a static analyzer for Objective-C, which used for checking formal correctness of Mobile Taobao APP on iOS platform. This software tool have capacity of finding some bugs in source file before delivery as consequence of reducing the probability of crash.</p>	
	Software Engineer intern	June 2016 to Aug 2016
	<p>YunOS BU, Alibaba group,</p> <p>I have tuned the fore-end of Google V8 virtual machine to add some functions for supporting static type annotation of JavaScript language, we named it as static-javascript. My main contributions to it including initial literature survey, making program and finally function test.</p>	
TEACHING EXPERIENCE	Teaching Assistant of Compiler course	Sept 2014 to June 2015
	<p>HuaZhong university of Science and Technology,</p> <p>I have taken responsible for reviewing student's assignment and solve some problem proposed by student about compiler.</p>	
OPEN SOURCE SOFTWARE	<i>XCC</i> C Compiler	Summer 2015 to present
	<p>This is a C language compiler named <i>XCC</i> for researching and studying compiler construction, e.g. constant propagation, sparse conditional constant propagation, constant folding, global value numbering, loop invariant code motion, induction variable simplification, dead code elimination, pointer analysis, and many analysis & transforms operated on natural loop. In the other hand, it also includes a little of machine-dependent optimization, such as peephole opt on x86 platform.</p> <p>The fore-end of <i>XCC</i> named <i>Jlang</i> has been already completed which can be used to lex, parse input source code. Then semantic action would</p>	

be performed on abstract syntax tree(AST) to check the correctness, more important thing is to report precisely diagnostics information at the given source location where error or warning occur.

In order to view the internal data structure of *Jlang*, *XCC* provide various of command line options to control the output result, e.g. dumping tokens with *-E*, dumping AST corresponding to source code with option *-ast-dump*, emitting LLVM 2.6-compatible IR with option *-emit-llvm* etc.

In terms of middle-end, the *XCC* is able to performance some important analysis and transformation passes, such as basic alias analysis, induction variable recognition, loop recognition, construction of dominator tree, dead code elimination, global value numbering, induction variable simplification, lcssa, loop invariant code motion, unused loop deletion, loop inversion, sparse conditional constant propagation, scalar replacement of aggregate, tail call elimination, unreachable basic block elimination etc.

Apart from fore-end and middle optimizer, effectively implementing the same semantic of IR code with machine-specific instructions is also greatly important part of complete compiler. In *XCC*, all of those work was implemented in directory backend of source tree, it consists of instruction selection, register allocation and no instruction scheduling. Currently, a naive instruction selection based on macro expansion has been completed. *XCC* supports two kind of register allocator, local register allocator with reuse of local register with local liveness analysis and a global allocator based on linear scan refined by Alkis Evlogimenos, wimmer.

Unfortunately, only x86 target is supported currently.

RESEARCH EXPERIENCE	Researching Assistant Department of computer science, HuaZhong university of science and technology Supervisor: Keshi, Ph.D	Sept 2015 to June 2017
BOOKS IN PREPARATION	1. Jianping Zeng . "Survey of Register allocation."	
REFERENCES	Keshi Professor School of computer science HuaZhong university of science and technology	Tel: 86-27-87541924 E-mail: keshi@hust.edu.cn

Guangxue Yue

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Jiaxing university

SOFTWARE
SKILLS

Computer Programming:

- C, C++, Java, C#, X86 assembly, Python, and Latex.

Compiler:

- familiar with common target-independently optimization upon IR in static single assignment form, data-flow/control flow analysis methods, instruction selection and register allocation, especially in register allocation. Also familiar with LLVM compiler infrastructure. Currently studying GCC.