

ZHANG, Mingxing

PERSONAL DATA

ADDRESS: Room 3-122, FIT Building, Tsinghua University, Beijing 100084, China
PHONE: +86-135-8175-1840
EMAIL: slothfulhamster@gmail.com, james0zan@gmail.com
BLOG: <http://MingX01.GitHub.IO>

EDUCATION

SEP. 2012 - PRESENT	Doctor of Philosophy, Computer Science, Tsinghua University Advisor: Prof. Yongwei Wu
MAR. 2014 - SEP. 2014	Visiting Student, Columbia University Advisor: Prof. Junfeng YANG
SEP. 2008 - JUL. 2012	Bachelor of Science, Computer Science, Beijing University of Post and Telecommunications GPA: 88.8/100.0, RANK: 1/316

SELECTED PROJECT

- **Detecting and Tolerating Concurrency Bugs**
We designed a novel anticipating-based invariant that can detect various types of concurrency bugs. Based on it, we also implemented a software-only tool for tolerating concurrency bugs on-the-fly. Since our tool is not based on roll-back, it can be two order of magnitude faster than previous approaches. This work won an **ACM SIGSOFT Distinguished Paper Award** at 2014.
- **Improving the Current Distributed Computing Frameworks**
I'm currently engaged in improving the current distributed computing frameworks. The products include: 1) a fusion-based optimizer that can achieve a speedup up to $5.82\times$; 2) a 3-D graph partitioner that can reduce at most 90.6% of network traffics for certain applications (e.g., ALS, Neural Network); and 3) a set of shrink-based distributed graph algorithms (e.g., our implementation of WCC is about $4\times$ faster than state-of-the-art).

INTERNSHIP

MAY. 2015 - AUG. 2015	LLVM at Google Summer of Code 2015 We built a dynamic analysis tool for detecting performance bugs. The tool is implemented by statically instrumenting host applications with LLVM. Several previously unreported bugs are detected by our tool and confirmed by the corresponding developers.
SEP. 2014 - DEC. 2014	Fulltime Intern at Google NYC During this internship, I implemented an automatic test data generation tool for databases. Under Shahan Yang's mentoring, we designed an algorithm that is both query-unaware and coverage-guaranteed. We also explored possible optimizations, such as perturbing the insertion order of BDDs.
MAY 2013 - AUG. 2013	Developer at MeePoTech MeePo is a distributed file system that focus on providing convenient sharing functionalities. I developed the first version of MeePo's Android client. And I also implemented the userspace filesystem part of MeePo's desktop client, which is based on PyFilesystem.

AUG. 2012 -
MAY 2013

Fulltime Intern at System Research Group, Microsoft Research Asia
Under Chuntao Hong's mentoring, I re-wrote Microsoft Search Technology Center's L-BFGS implementation in MPI, which reduces the execution time from 3 days per 40 iterations to less than 3 hours (2TB data in total, 20*16 cores). And I also wrote a MSMPI plugin for YARN. I got an *excellent* assessment for this internship.

PUBLICATION LIST

- Exploring the Hidden Dimension in Graph Processing.
Mingxing Zhang, Yongwei Wu, Kang Chen, Xuehai Qian, Xue Li, and Weimin Zheng.
Submitted to OSDI '16.
- RFP: When RPC is Faster than Server-Bypass with RDMA.
Maomeng Su, **Mingxing Zhang**, Kang Chen, Yongwei Wu, and Weimin Zheng.
Submitted to SoCC '16.
- Photon: High Performance Graph Processing with Distributed Property Array.
Pin Gao, **Mingxing Zhang**, Kang Chen, Zhenyu Guo, and Yongwei Wu.
Submitted to IEEE Transactions on Computers 2016.
- Measuring and Optimizing Distributed Array Programs.
Mingxing Zhang, Yongwei Wu, Kang Chen, Teng Ma, and Weimin Zheng.
Proceedings of the 42st International Conference on Very Large Data Bases (**VLDB '16**).
- A Lightweight System for Detecting and Tolerating Concurrency Bugs.
Mingxing Zhang, Yongwei Wu, Shan Lu, Shanxiang Qi, Jinglei Ren, and Weimin Zheng.
IEEE Transactions on Software Engineering (**TSE**) 2016.
- What is Wrong With the Transmission? - A Comprehensive Study on Message Passing Related Bugs.
Mingxing Zhang, Yongwei Wu, Kang Chen, and Weimin Zheng.
Proceedings of the 44th International Conference on Parallel Processing (**ICPP '15**).
- Fixing, Preventing, and Recovering From Concurrency Bugs.
*DongDong Deng, GuoLiang Jin, Marc de Kruijf, Ang Li, Ben Liblit, Shan Lu, ShanXiang Qi, JingLei Ren, Karthikeyan Sankaralingam, LinHai Song, YongWei Wu, **MingXing Zhang**, Wei Zhang, WeiMin Zheng.
Invited Paper in Science China Information Sciences (**SCIS**) 2015.
* All the authors contributed equally.
- AI: A Lightweight System for Tolerating Concurrency Bugs.
Mingxing Zhang, Yongwei Wu, Shan Lu, Shanxiang Qi, Jinglei Ren, and Weimin Zheng.
Proceedings of the 22nd ACM SIGSOFT International Symposium on the Foundations of Software Engineering (**FSE '14**).
Won ACM SIGSOFT Distinguished Paper Award!

SCHOLARSHIPS AND CERTIFICATES

2014 2013	ACM SIGSOFT Distinguished Paper Award (at FSE '14) Award of Excellence, Microsoft Research Asia Internship Program
2015 2012 2011 & 2010	China National Scholarship for Ph.D. (¥30,000) Tsinghua Scholarship for Freshmen (¥30,000) China National Scholarship for Undergraduate Student (¥8,000 for each year)
MAY 2012 MAY 2012 APR. 2012 OCT. 2011 NOV. 2010 MAY 2010 NOV. 2009	36 th Place, 2012 ACM-ICPC World Finals. 2 nd Place, Gold Medal, 2012 ACM-ICPC China Changchun Invitational Programming Contest. 4 th Place, Gold Medal, 2012 ACM-ICPC China Jinghua Invitational Programming Contest. 8 th Place, Gold Medal, The 2011 ACM-ICPC Asia Shanghai Regional Contest. 9 th Place, Gold Medal, The 2010 ACM-ICPC Asia Fuzhou Regional Contest. Gold Medal, 2010 ACM-ICPC China Hangzhou Invitational Programming Contest. Silver Medal, The 2009 ACM-ICPC Asia Harbin Regional Contest.

章明星

个人资料

地址: 北京清华大学 FIT 大楼 3-122 室, 邮编 100084
电话: +86-135-8175-1840
Email: slothfulhamster@gmail.com, james0zan@gmail.com
Blog: <http://MingX01.GitHub.IO>

学习经历

Sep. 2012 – Present	清华大学计算机科学博士 导师: 武永卫教授
Mar. 2014 – Sep. 2014	纽约哥伦比亚大学访问学生 导师: Prof. Junfeng Yang
Sep. 2008 – Jul. 2012	北京邮电大学计算机科学与技术学士 GPA: 88.8/100.0, Rank: 1/316

主要研究项目

- 多线程软件错误的监测与容错
我们设计了一套新型的基于预测的软件不变量。该不变量可以用来检测包括原子性违例以及顺序性违例在内的多种软件错误。同时, 我们还设计并实现了一套基于这一不变量进行多线程软件错误容错的工具。由于我们的工具不依赖于复杂的回滚机制, 其开销远小于之间的技术。在2014年的 FSE 上, 这一套系统获得了 ACM SIGSOFT 颁发的 Distinguished Paper Award。
- 分布式计算系统性能优化
分布式计算系统的性能优化是目前我主要的研究方向。主要成果包括 1) 一个基于 fusion 技术的分布式算法优化器, 其在测试中最高可以实现 5.82 倍的速度提升; 2) 一个 3-D 图数据划分算法, 对于特定算法 (如 ALS 和神经网络) 其最高可以节省 90.6% 的网络通讯量; 3) 一套基于图收缩的分布式算法, 举例来说, 基于其实现的 WCC 算法比当前已有系统快将近 4 倍。

实习

May. 2015 – Aug. 2015	在 Google Summer of Code 2015 中参与 LLVM 项目开发 我们设计并实现了一个可用于检测软件效率错误的动态分析工具。其实现是基于 LLVM 进行的静态插装。经过测试, 我们发现并汇报了一些之前未被监测到的开源软件错误, 并得到了相关开发人员的确认。
Sep. 2014 – Dec. 2014	Google NYC 全职实习 在 Shahan Yang 的指导下, 我实现了一套与查询无关但依然能够保障覆盖率的数据库测试数据生成工具。我们还对相关效率优化技术进行了研究, 包括调整 BDD 的插入顺序等。
May 2013 – Aug. 2013	MeePoTech 软件开发 MeePo 是一个主要面向群组分享的分布式文件系统。我负责开发了 MeePo 的第一套安卓程序。同时, 我还基于 PyFilesystem 开发了 MeePo 桌面客户端的用户台文件系统部分。
Aug. 2012 – May 2013	微软亚洲研究院系统研究组全职实习 在洪春涛的指导下我基于 MPI 重写了微软必应部门的 L-BFGS 算法实现, 将该应用的运行时间从原始版本的3天降低到3小时 (2TB 数据, 20*16 CPU)。同时, 我还实现了一个用于支持 MSMPI 在 YARN 上运行的插件。这一次的实习获得了微软亚洲研究院颁发的优秀实习生证书。

论文列表

- Exploring the Hidden Dimension in Graph Processing.
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- Fixing, Preventing, and Recovering From Concurrency Bugs.
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Invited Paper in Science China Information Sciences (SCIS) 2015.
* All the authors contributed equally.
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Proceedings of the 22nd ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE '14).
Won ACM SIGSOFT Distinguished Paper Award!

曾获奖励

2014	ACM SIGSOFT 杰出论文奖 (FSE 2014)
2013	微软亚洲研究院 “明日之星” 项目优秀实习生
2015	博士生国家奖学金
2012	清华新生奖学金
2011 & 2010	本科国家奖学金
May 2012	2012 年 ACM-ICPC 世界总决赛第 36 名
May 2012	2012 年 ACM-ICPC 长春全国邀请赛亚军
Apr. 2012	2012 年 ACM-ICPC 金华全国邀请赛金牌 (第 4 名)
Oct. 2011	2011 年 ACM-ICPC 上海区预赛金牌 (第 8 名)
Nov. 2010	2010 年 ACM-ICPC 福州地区预赛金牌 (第 9 名)
May 2010	2010 年 ACM-ICPC 杭州全国邀请赛金牌
Nov. 2009	2009 年 ACM-ICPC 哈尔滨地区预赛银牌