

# JIANFENG CHEN

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## WORK EXPERIENCE

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### Meta Platforms (*formerly Facebook*) | Research Scientist

Jul 2019 - Present

*Family of Apps Data Framework (GraphQL)*

#### Language Compiler

- Major contributor to revamp OSS GraphQL Compiler **using Rust**, tailored for client-side GraphQL implementation across various Meta family apps such as Facebook, Instagram, Oculus, WhatsApp, Horizon, and others;
- Spearheaded the prototyping and optimization of the GraphQL compiling process; notably slashed the build time for GraphQL modules within the Facebook app from 38 mins to 17 secs, **99% reduction**;
- Worked and promoted the fragment variable as a new feature to the GraphQL open source specifications.

#### Automated SE tools

- Led the development of GraphQL toolchains, delivering real-time query and schema validation tools;
- Major contributor to GraphQL **IDE plugins** like VS Code and Android Studio in Meta;
- Conducted static code analysis (**code indexing**) for Java and ObjC to identify unreachable modules, resulting in the removal of redundant fields in the product; this effort contributed to saving **over \$10 million** in power usage;
- Orchestrated **Cloud Based CI/CD** Platform for mobile developers.

#### Mentoring and Invited Talks

- Provided mentorship to three interns and facilitated the onboarding process for two mid/senior-level engineers;
- Invited talk (Droidcon 2021): *Integrating custom language with android studio: GraphQL case study*;
- Invited talk (cdCon 2022): *GraphQL Dev Supporting Tools in Meta*.

## EDUCATION

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### PhD in Computer Science

Aug 2014 - May 2019

North Carolina State University, GPA: 4.0/4.0

Advisor: Dr. Tim Menzies (ACM Fellow, IEEE Fellow, ASE Fellow)

Dissertation: On the Value of Sampling and Pruning for Search-Based Software Engineering

### Master in Computer Science (*En route*)

Aug 2014 - Dec 2018

North Carolina State University, GPA: 4.0/4.0

Coursework: Automated SE | DevOps | Advanced AI | Algorithm Analysis | Data Mining | Data-to-Knowledge

### BS in Computer Science

Sep 2010 - May 2014

Shandong University, China, GPA: 89.93/100

Coursework: Data Structure | OS | Networking | Database System | Numerical Analysis | Compilers

## SKILLS AND INTERESTS

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**Language:** Rust, Python, C++, Java, JavaScript, Matlab and SQL;

**Data analysis tools:** Scikit-learn, SciPy, Pandas, jMetal, Gephi;

**DevOps tools:** Jenkins, Ansible, Travis-CI, AWS Elasticsearch, S3, Docker, Redis.

## INTERN AND RESEARCH EXPERIENCE

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### Spike: Predicting Breakdowns in Cloud Services

Sep 2018- Apr 2019

*Cooperation project with LexisNexis Legal & Professional*

- Fetched cloud services monitoring data in microservices systems;
- Cleaned up the data and built machine learning models to predict the breakdowns 30 minutes ahead;
- Got a alarm system for service spikes with recalls and precision of 75% or above;
- Published results on Symposium on the Foundations of Software Engineering 2019 (Industrial track).

### Cross-Stan: Embedding Bayesian Modeling in Python and C++ Programs

May 2018- Aug 2018

*Internship at Facebook (Machine learning experience group)*

- Created the tool *CxStan* to embed Bayesian Modeling engine, Stan, into Python and C++ programs;
- Built a hierarchical framework to accelerate the Monte Carlo Sampling for the Stan modeling;

- Integrated the tool into the buck build tool, making the Stan engine as a service;
- Applied the *CxStan* to some Facebook services' traffic policing.

### **Automated Configurations for Cloud-based Workflows**

May 2017 - Aug 2017

*North Carolina State University*

- Presented a novel stochastic method for rapidly configuration cloud-based workflows;
- Automatically deployed the workflow with more than 500 sub-tasks to AWS platform. Save up to 30% economy cost within specific deadline requirement, compared to default greedy deployment policy in AWS.

### **LACE Data Privatization Tools and its Application**

Aug 2016 - Nov 2016

*NSA funded project in RAISE Lab*

- Distributed a data anonymization package in Python , tested package via Travis-CI;
- Applied my package to education and medical data sets. Evaluate data set utility through supervised learning.

### **Fast Principal-component-analysis (F-PCA) Method for Flight Status Log**

May 2016 - Aug 2016

*Google Summer of Code program 2016*

- Accepted by Google GSoc2016 program among 18,981 applicants (**accept rate: 6%**);
- Hierarchical clustering a dataset(flight status log) with more than 20M entries top-down and bottom-up. Create a PCA-like dimension reduction algorithm and speed it up by spark. Compared my own algorithm with PCA.

### **Sampling vs. Searching in Search-based SE**

Dec 2014 - Aug 2017

*North Carolina State University*

- Created a sampling technique to solve the software product line problem. Deployed the algorithm into platform LSF by MPI; implemented a job schedule engine. Reduced the experiment time from 2 months CPU hrs into 11.5 hrs.
- Modeled the Linux Kernel modules in CNF sets. Created the decision tree surrogate model. By combining SAT solvers, found a way to configure large software systems 2000x faster. Published the results in TSE.

## **PUBLICATIONS**

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- [1] Xueqi Yang, **Jianfeng Chen**, Rahul Yedida, Zhe Yu, and Tim Menzies. "Learning to recognize actionable static code warnings (is intrinsically easy)." Empirical Software Engineering (2021)
- [2] Shu Rui, Tianpei Xia, **Jianfeng Chen**, Laurie Williams, and Tim Menzies. "How to better distinguish security bug reports (using dual hyperparameter optimization)." Empirical Software Engineering (2021)
- [3] **Jianfeng Chen**, Joymallya Chakraborty, Philip Clark, Kevin Haverlock, Snehit Cherian and Tim Menzies. "Predicting Breakdowns in Cloud Services (with SPIKE)". Symposium on the Foundations of Software Engineering (ESEC/FSE 2019)
- [4] Junjie Wang, Song Wang, **Jianfeng Chen**, Tim Menzies, Qiang Cui, Miao Xie and Qing Wang. "Characterizing Crowds to Better Optimize Worker Recommendation in Crowdsourced Testing.". IEEE Transactions on Software Engineering(2019).
- [5] **Jianfeng Chen**, and Tim Menzies. "RIOT: A Stochastic-Based Method for Workflow Scheduling in the Cloud." 2018 IEEE 11th International Conference on Cloud Computing (CLOUD). IEEE, 2018. (Accept rate: 15%).
- [6] Vivek Nair, Amrit Agrawal, **Jianfeng Chen**, Wei Fu, George Mathew, Tim Menzies, Leandro Minku, Markus Wagner, and Zhe Yu. "Data-Driven Search-based Software Engineering." The Mining Software Repositories (MSR) 2018.
- [7] **Jianfeng Chen**, Vivek Nair, Rahul Krishna, and Tim Menzies. "Sampling as a Baseline Optimizer for Search-based Software Engineering." IEEE Transactions on Software Engineering (2018).
- [8] **Jianfeng Chen**, Vivek Nair, and Tim Menzies. "Beyond evolutionary algorithms for search-based software engineering." Information and Software Technology (2017).
- [9] Vivek Nair, Tim Menzies, and **Jianfeng Chen**. "An (accidental) exploration of alternatives to evolutionary algorithms for SBSE." In International Symposium on Search Based Software Engineering, pp. 96-111. Springer, Cham, 2016.
- [10] Yijun Yang, Wei Zeng, and **Jianfeng Chen**. "Equiareal parameterizations of NURBS surfaces". Graphical models 76.1 (2014)