

## Summary

I am a **software architect** and **full-stack software engineer** with 9 years of experience in industry. I specialize in building:

- **complex web sites and web applications**, such as [Notablist.com](http://Notablist.com)
- **software-as-a-service (SaaS) implementations**
- **programming tools**, such as compilers and runtimes for domain-specific languages

I've worked on projects in a variety of domains, from supercomputing to the digital humanities. My strengths are a solid foundation in Computer Science, a range of hands-on skills, critical thinking, a systematic approach to new problems, attention to detail, high personal standards, a strong work ethic, and the ability to work autonomously. I am a lifelong learner and avid reader, especially of history.

## Education

- |      |   |
|------|---|
| 2009 | <b>Ph.D., Computer Science</b> , University of Cambridge<br>Dissertation: <a href="#">Stage scheduling for CPU-intensive servers</a>        |
| 2005 | <b>Diplom Informatiker</b> , Technische Universität Berlin<br>Diplomarbeit: <a href="#">Staged design for highly concurrent web servers</a> |
| 2003 | <b>B.Sc., Computer Science</b> , Oklahoma State University Tulsa  |

## Projects

### 6/2017 – ongoing **Full-stack development for Motivated Cognition experiment**

Columbia University / New York, NY USA and remote

Motivated Cognition is a psychology research experiment investigating the effects of cognitive bias on our consumption of information online.

Activities    Created a complete web application from a high-level specification, using TypeScript, Bootstrap, Knockout.js, and webpack on the frontend; Java with microservices, YAML configuration, and MongoDB persistence on the backend; Jenkins continuous integration; and Docker deployment

Generated code for models and services in TypeScript and Java

Integrated with Mechanical Turk for subject recruitment

### 4/2016 – ongoing **Full-stack development for Polygon Analytics**

Polygon Analytics Ltd. / Edinburgh, UK (remote only)

Activities    Designed and implemented proprietary software in C++ and Python

### 9/2014 – ongoing **Software architecture and full-stack development for the [Notablist](#) email newsletter search engine**

New York, NY USA and remote

Notablist indexes millions of email newsletters from hundreds of thousands of publishers and provides both a search interface and real-time change alerts to users.

Activities    [Backend prototyping in Python](#):

- Classified signup responses and mapped form inputs using numpy/scipy/scikit-learn

[Backend production rewrite in Java](#):

- Generated Python JSON-RPC clients, Python command line tools, Java service interfaces and abstract implementations, and Java JSON-RPC servlets from Thrift interface and data structure definitions

- Implemented Guice-injected Java micro-services that encapsulated MongoDB collections; ElasticSearch indices; Redis databases; S3 buckets; screenshotting and signups with Selenium; SpamAssassin checking; logstash queries; Stripe integration; Drip (CRM) integration; MailChimp, SparkPost, and SendGrid transactional email posting; etcd locking; DNS and whois querying and parsing; DMOZ category and Alexa and Quantcast rank lookups
- Designed and implemented a scalable distributed system for processing Common Crawl WARC records and submitting newsletter signups
- Created administrative user interface in Vaadin
- Set up Jenkins continuous integration
- Deployed with Docker+Compose on real hardware

#### Frontend:

- Assumed responsibility for a three year-old Bootstrap+Backbone.js+Marionette.js code base in JavaScript
- Incrementally migrated code from JavaScript to TypeScript
- Added Selenium (Java) browser tests

### **7/2012 – ongoing Full-stack development of the TeraScript product suite**

Tronics Software LLC / Stirling, NJ USA and remote

TeraScribe and TeraScript Server are a visual development environment and server-based runtime for TeraScript Action Files (TAFs), TeraScript Class Files (TCFs), and the TeraScript Markup Language (TML). TML is a markup-based web application language, similar in spirit to ColdFusion. TAF and TCF are ways of organizing TML.

#### **Activities** TeraScript Server 8:

Rewrote TeraScript 7 in Java while maintaining strict backwards compatibility:

- Grammar-based compilers for TML and associated little languages using ANTLR
- Tree interpreters for TML, TAF, and TCF
- Versioned OSGi bundles with Maven and Apache Felix
- Library of standard functions, primitive types, and collections with extensive unit tests

#### TeraScript Server 7 (formerly Witango Server):

Reorganized, cleaned up, and modernized a 17-year-old C++ code base and addressed numerous bugs and feature requests for the server's first major release in over two years; now in maintenance releases

Eliminated diverging platform-specific build systems (on Win32, Linux, and OS X) in favor of CMake and ported the code base to Win64 using Visual C++ 2012

Designed and implemented a SQL generator that visits dialect-specific trees of SQL-99 constructs

#### TeraScribe 8:

Reorganized and cleaned up a 10-year-old Java Swing code base in order to add a number of features to the code editor, including autocomplete and syntax highlighting, and refit the data source management interface to use JDBC metadata

#### Subcontracting:

Debugged production installations of TeraScript Server 7 and 8

Developed cross-platform (Android, iOS, Windows) mobile app prototype with Xamarin Forms and C#

### **4/2017 – 5/2017 Drug name comparison project**

PSW Applied Research Inc. / Toronto, ON and remote

#### **Activities** Implemented Kondrak's phonetic alignment and similarity algorithm (ALINE) and a bigram-based orthographic algorithm (BI-SIM) as a PostgreSQL C extension

Built a JavaScript demo application using jQuery and Bootstrap

### **4/2014 – 7/2014 Application development for the Muninn Project under contract to the Library and Archives Canada**

PSW Applied Research Inc. / Toronto, ON and remote

#### **Activities** Created a command-line Java application for transcribing handwritten World War I medical records from the Canadian Expeditionary Force (<http://blog.muninn-project.org/node/79>) using Amazon's Mechanical Turk crowdsourcing service: precut images for groups of lines, redundancy between workers, artificially-

introduced mistakes and edit distances to detect cheating, and feedback to workers

- 3/2013 – 7/2013**    **Back end development for Txtmrkt, a marketplace for digital publications**  
Txtmrkt LLC / New York, NY USA and remote
- Activities    Designed and implemented a Model-View-Controller-based Java web application with Guice-injected microservices backed by Amazon S3
- Authenticated and authorized users with Shiro
- Integrated co-branded order placement and payment notification with Amazon's Flexible Payments Service
- 
- 12/2011 – 6/2012**    **Haystack: performance monitoring platform for online businesses**  
GrokIO LLC / New York, NY USA
- Activities    Designed an agent (Python) and manager (Java with Spring Security+MVC and Guice) architecture for gathering, storing, and querying time series data and metadata
- Implemented time series databases from scratch using relational tables and memory-mapped files
- Wrote RFC 3986 grammar-based URL and URN parsers using Ragel (Java) and pyparsing (Python)
- Generated service interfaces in Java and Python with custom Protocol Buffers compiler plugins
- Coded agent plugins in Java and Python for discovering and fetching metric metadata and data:
- Open source monitoring systems: Nagios, Ganglia, collectl, Graphite
  - Open source server software: Apache httpd, nginx, MySQL, memcached, MongoDB, JMX
  - Platform interfaces: procfs, sysctl, WMI, SNMP
  - Third party APIs: Google Analytics, MailChimp, Spring Social, Amazon CloudWatch
- Supervised user experience and graphic designers in Ukraine
- Implemented a client-side user interface with the Google Web Toolkit, starting from wireframes:
- Architectural best practices: Model-View-Presenter; event bus; activities and places
  - Custom widgets: date time range picker, cell table pager, search box, selection tree
  - .war deployment to Tomcat with Maven
- 
- 8/2011 – 12/2011**    **Back end development for Birchbox, a personalized subscription service for women's cosmetics samples**  
Birchbox Inc. / New York, NY, USA
- Activities    Designed, implemented, documented, and successfully deployed warehouse integration code in Java (back end) and PHP (administrative front end)
- Wrote a Thrift compiler and targets in Python+pyparsing to generate Java and PHP from Thrift definitions
- Produced ad hoc business reports from MySQL using Java and Jython
- 
- 5/2011 – 8/2011**    **Benchmarking server stacks in order to accurately provision EC2 instances at Chartbeat, a real-time web analytics software-as-a-service provider**  
Chartbeat Inc. / New York, NY, USA
- Activities    Synthesized a realistic benchmark for front-line web servers from statistical analyses of nginx access logs
- Significantly reduced network bandwidth and latency on production servers with targeted optimizations
- Wrote Python scripts for analyzing Ganglia RRDs, replaying HTTP request streams, harnessing httpfs
- 
- 10/2010 – 4/2011**    **File I/O library for X10, a type-safe, parallel object-oriented language for high-productivity computing**  
IBM Research / Hawthorne, NY, USA
- Activities    Designed, implemented, tested, and documented a new low-overhead, buffer-based file library for X10:
- inspired by POSIX, FUSE, Boost.Filesystem, and Java NIO.2
  - X10 and native code for the Java and C++ source-to-source compilation backends
  - Scatter/gather I/O, aligned buffers, memory-mapped files, advisory locking
- Microbenchmarked the X10 runtime

**1/2009 – 7/2010**    **LXFS: fast and reliable data storage for High-Performance Computing clusters**  
NEC High Performance Computing Europe / Stuttgart, Germany

Activities    Wrote Python and bash scripts for configuring, deploying, and administrating LXFS installations: Lustre and Inet configuration (MGS, MDS, OSS, clients); redundant NFS exports; Nagios, Ganglia, and collectl monitoring; Heartbeat/Linux-HA services for failover; Promise RAID devices; network interfaces (Infiniband, bonded Ethernet)

Finished two major LXFS releases, used in numerous deployments

Debugged and resolved issues in production parallel file systems

**1/2009 – 7/2010**    **XtreemFS: a distributed and replicated file system for wide-area networks**  
NEC High Performance Computing Europe / Stuttgart, Germany

Activities    Designed, implemented, and tested the XtreemFS userspace client:

- FUSE and Dokan (Windows FUSE-like library) interfaces
- Multiple pipelined ONC-RPC streams to a single server
- Staged, event-driven concurrency for robust performance under load
- Close-to-open file caching with per-file page sizes
- Automatic failover between file replicas on timeout
- Heavily benchmarked under different I/O loads (iobench, dbench, metadata benchmarks)

Finished two major XtreemFS releases, both used in production

Collaborated with academic and industry partners in Europe, Israel, and China

## Teaching Experience

**2/2014 – 4/2014**    **SQL Fundamentals and Python Fundamentals workshops for Ph.D. students and post-doctoral researchers in the natural sciences**  
Iowa State University / Ames, IA USA

**2002 – 2004**    **Technical supervision of Masters' theses**  
Oklahoma State University / Tulsa, OK USA

**1/2002 – 3/2002**    **Mathematics tutoring for 6th and 7th graders**  
Tulsa Public Schools / Tulsa, OK USA

## Computer Skills

**Programming**    Java; Python; TypeScript; C++; C; SQL; C#; JavaScript

**Frameworks**    Thrift; Protobufs; Guice; Guava; Shiro; jQuery; Bootstrap; Knockout.js; Backbone.js

**Databases**    ElasticSearch; MongoDB; Redis; SQLite; H2; SQL Server

**Platforms**    Windows; Debian- and RedHat-based Linux; OS X

**IDEs and tools**    Visual Studio; Eclipse; IntelliJ; Visual Studio Code; Maven; CMake

**Revision control**    Git; Subversion

## Personal

**Languages**    English (native); German (fluent)

**Hobbies**    Reading (history, biography, popular science); photography; Tai chi; open source software