Matthew Gerring

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PROFILE

Expert programmer of scientific and numerical software.
Experienced with developing software for a wide range of scientific projects helping researchers deploy software solutions. Someone that makes new ideas happen. Track record of delivering complex and demanding projects on time, to budget and with a high quality level.

KEY SKILLS

Scientific Programming and scaling algorithms. Serverless and stateless microservices on cloud platforms. Expert architect and programmer.

Java: Spring Boot, Collections and concurrency, AMQ, Kafka

Database: Neo4j, Hiberante/JPA, PostgreSQL, others

Frontend: Swing, SWT/RCP, Angular (PrimeNG)

Python: numpy, pandas, scipy, scikit learn

Could: AWS: S3, Lambda, DynamoDB; GCP: Functions, Firestore, Compute Engine; Azure: DevOps

TDD: JUnit, Pytest, Cucumber, Squish, Selenium, many others

EDUCATION

MEng hons Birmingham University Chemical Engineering	1993-1998
Diploma Industrial Studies	1996
A-levels A,B,B (Chemistry, Maths, Physics)	1993
10 GCSE's A, AA (Maths, Science)	1991

CAREER HISTORY

August 2020 - Present

Jackson Laboratory (www.jax.org)
Scientific Software Engineer

This role is as a senior software developer working for Jackson Laboratories. I work bringing to production research software which has been created by scientists at the facility. I also work directly with scientists to create new software. For example a scientist may have an experimental algorithm written in R which they would like to scale with big data in the cloud, have a web frontend and be exposed publicly so that it can be referenced in a paper.

Examples of projects I worked upon in the last twelve months are a graph database to hold and connect all human and mouse genes. A video analysis system for identifying phenotypes. A gene expression plotting tool using data reorganisation and JPA to plot violin plots for all human genes known to reference animals.

Open source repos

- https://bitbucket.org/geneweaver/gweaver-bulk-import/src/master/
- https://bitbucket.org/geneweaver/gweaver-stream-io/src/master/
- https://bitbucket.org/geneweaver/gweaver-homology-service/src/master/
- https://bitbucket.org/geneweaver/gweaver-tidy-plotter-service/src/master/
- https://bitbucket.org/geneweaver/gweaver-tidy-plotter-frontend/src/master/

October 2017 - July 2020

Halliburton International Inc. (www.halliburton.com)
Scientific Software Engineer and Team Lead

Responsible for designing and implementing with the team, a scalable system for running a decision tree based supervised machine learning algorithm written in python. The algorithm is a classification of value if it could scale and inject large data volumes. We design this using microservices rather than serverless for business reasons. My role was as a senior programmer, I also lead the team and worked with the data scientist who was new to programming to get her code production ready and unit tested (pytest). I designed and wrote an aggregator pattern, including several stateless microservices to scale the classification linearly with load. We compiled these services into docker containers to be deployed in Kubernetes (on AWS and Azure) using Jenkins and saving the binary to artifactory. There was also an Angular front end service based on Node.js server. We used existing docker containers from docker hub for the deployment. TDD and BDD were used throughout, we kept the unit test coverage high from the start of the build using a rule in the build run from jenkins.

The design and implementation of this project was intentionally cloud vendor neutral and autoscaling using our own services. It is possible to use available serverless technologies as well to solve this problem.

Most of this private source but there was one library in Java we released open source: github.com/h5jan/h5jan-core

February 2009 - September 2017

Diamond Light Source Ltd. (www.diamond.ac.uk)
Senior Software Engineer and Core Team Lead

A senior software development position at the United Kingdom's largest science project. Responsible for leading and developing Java and Python products including servers and thick clients in teams of 4 to 12 developers.

I headed software development technically writing a large proportion of the products. Highlights: a new scanning algorithm based around AMQ with python components, a new data analysis platform called DAWN (dawn.org) which contains a python data analysis API, image processing pipelines for fast detectors, analysis of microscope image stacks, deployment of a new pipeline tool on clusters including image processing mathematics (nD analysis pipelines).

Responsibly running stand-ups and sprints, planning for future features, analyse of requirements, application architecture, and ruthlessly applying TDD methodology (while trying to ensure that everyone enjoyed themselves). Agile development practices used based on Scrum and DSDM Atern. Introduction of new technologies such as AMQ, IoT libraries and Redis.

Started new open source projects including:

- github.com/eclipse/january
- github.com/eclipse/scanning
- github.com/eclipse/richbeans
- github.com/eclipse/dawnsci

(Worked for sixteen months at the ESRF in Grenoble France during this position this introduced me to GPU's, Cython and Jupyter for the first time.)

June 2001 - December 2008

EASA Ltd. (www.easasoftware.com)
Senior Software Developer

A senior software development and management position at a small start-up company based around Java and C++ technologies, JSF, Tomcat and a Swing thick client. The business is a software consulting business which I

jointly started up and took to a successful position. EASA is still flourishing, I do not have a financial stake in it.

Responsibilities: software development and user interface design, pre-sales support, managing sub-projects, technical input to business negotiation, engineering design and validation. User interfaces created using Java-Swing, deployed using Java web start, also web applications in JSF deployed in various containers including Tomcat/JBoss. Communication with the server via HTTP/servlets.

Some fun and interesting applications including: A model for separator design for a leading Oil and Gas company. A series of applications for modelling air flow in factories, hospitals, classrooms and car parks using CFD for the HVAC industry (popular in Scandinavia). An application for dental implant fitting using an ANSYS model. A database backed neutron model for use in fusion research at ITER. Design of tundish for steel manufacture using CFD. A middle-ware application for the London Metal Exchange. Risk estimation software for a leading insurance company.

A version of agile development used. TDD development practices used. Accurev and SVN source code control. Junit for testing and Ant for product integration.

June 1998 - June 2001

ANSYS Ltd.
Software Developer

Software developer for software using computational fluid dynamics software. Responsible for developing various user interfaces in Java Swing and other technologies. Worked with finite element analysis solving the Navier-Stokes equations of fluid flow. Meshing and visualization were also important.

July 1997 - September 1997

Monsanto Plc.
Research and Development Engineer (vacation student)

Developing a system for processing waste product from extracting alginates for use the food industry. Responsible for designing and commissioning a new pilot system.

August 1995 - August 1996

Great Lakes Fine Chemicals plc,
Process Design Engineer (sandwich student)

Process design engineer designing and commissioning multi-purpose batch plant. Diploma in industrial studies.

MAJOR ACHIEVEMENTS

- Created a graph database mapping all human genes to all mouse genes (and other species). Made the deployment available and usable to researchers in the field.
- First microservices designed and deployed at Halliburton for the geological space. Scalable machine learning algorithms taken to initial revenue stage and installed on many customer clouds.
- Architecture for Data Acquisition version 9 used at Diamond Light Source. Moved the server to SOA, breaking up into many separate services. Lead a large multi-disciplined team.
- Open source committer on many projects and starting new projects.
- Creation of a new data analysis workbench for use in Synchrotron facilities called DAWN www.dawnsci.org
- Jointly started the Eclipse Science Working Group science.eclipse.org
- Experienced speaker at conferences in Europe and US
- Software architecture for the EASA software including application authoring system and invention of new software.
- US Patent (2002) and UK Patent (2003)
- Creation of a custom code ability, which enabled EASA to deploy features on the fly, commercially most successful feature.

- A web service to excel which supports VB and multiple web clients by running copies of desktop excel in a pool
- Delivering a companywide software system, with hundreds of users, to Proctor and Gamble.

TRAINING

Registered Agile Practitioner, AWS minicourses, Hands On, UML diagramming, Software Project Planning and Management, Java for Distributed Systems, RMI JMS JNDI.

ACTIVITIES & INTERESTS

Folk music and dancing, Diving, Skiing, Judo, Cricket, Mountain biking, Camping/fishing/outdoors, Wildlife, Writing Science Fiction Books.

REFERENCES

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PUBLICATIONS

Processing two-dimensional X-ray diffraction and small-angle scattering data in DAWN 2
May 2017Journal of Applied Crystallography 50(3)
DOI: 10.1107/S1600576717004708
LicenseCC BY 2.0. Citations 194

Data Analysis WorkbeNch (DAWN)
May 2015Journal of Synchrotron Radiation 22(Pt 3) Follow journal
DOI: 10.1107/S1600577515002283
LicenseCC BY 2.0. Citations. 233

The use of workflows in the design and implementation of complex experiments in macromolecular crystallography
August 2012Acta Crystallographica Section D Biological Crystallography 68(Pt 8):975-84
DOI: 10.1107/S090744491201863X
SourcePubMed
LicenseCC BY 2.0 Citations. 37