Adrian Lange, PhD

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employment

Big Data Engineer, iTunes Analytics — May 2015 – present
Apple — *Cupertino, CA*

- Develop analytics infrastructure to generate insights into customer experiences on products such as the App Store, Apple TV, and Apple Music *[Java, Python, Splunk, Cassandra, Hadoop, JavaScript]*
- Utilize machine learning, statistics, and data mining to perform data analysis, segmentation, and hypothesis testing

Software Developer — August 2013 – April 2015
Signal (formerly known as BrightTag) — *Chicago, IL*

- Developed data models, algorithms, and back-end services to build and analyze user profile networks for millions of daily users; stored in NoSQL database with billions of records (~50 TB) *[Java, Cassandra, Python, Spark]*
- Created real-time anomaly detection and network traffic forecasting system using Fourier analysis capable of predicting regular traffic patterns for upcoming week with >90% accuracy

Postdoctoral Appointee — March 2012 – July 2013
Argonne National Laboratory Leadership Computing Facility — *Chicago, IL*
University of Chicago

- Optimized massively parallel physics/chemistry simulations on IBM Blue Gene/Q supercomputer (3 on Top500); increased code speed over 8x, scalability from 1024 to ~0.4 million CPU cores *[C++, C, MPI, OpenMP, Python]*
- Invented quantum proton transport model utilizing statistical optimization (e.g. simulated annealing)

PhD Student Researcher — June 2007 – March 2012
The Ohio State University — *Columbus, OH*

- Researched quantum chemistry and statistical thermodynamics: mathematical theory, computation, and algorithms; implemented chemistry/physics models in efficient code *[C++, C, Fortran]*
- Published 10 first author journal articles; presented at 20+ professional and academic events

technical skills

Category	*Proficiency in approximate descending order from left to right*
Programming Languages	Java, Python, JavaScript, C++, C, awk, Unix/Linux shell (bash), Fortran
Web Technologies	HTML, CSS/SCSS, Flask, Node.js, jQuery, Jinja, AJAX, web workers
Databases/Storage	Cassandra, MySQL, Splunk, HDFS, Kafka, Redis
Data Analysis/Modeling	pandas, numpy, scikit-learn, SciPy, Keras, Lasagne, R
Compute Technologies	Spark, Hadoop (MapReduce), MPI, OpenMP
Productivity Tools	git, vim, IPython/Jupyter, LaTeX, Charles, svn
Software Engineering	Test Driven Development, architecture design, code review, agile development

education

PhD Computational/Physical Chemistry — June 2007 – March 2012
The Ohio State University — *Columbus, OH*

B.S. Chemistry, minor Microbiology — August 2003 – June 2007
The Ohio State University — *Columbus, OH*

Supplemental Online Courses:
Udacity: Web Development, Programming Languages, Parallel Programming (GPU), Machine Learning
Coursera: Data Science Signature Track, Machine Learning, Algorithms, Databases, Neural Networks

projects & additional experience

To see some code I have written (including projects below), please visit my GitHub account: github.com/awlange

BrainSparks & Calrissian 2015 – present

Experimental neural network library; supports MLP, 1D convnet, particle network (my own flavor of ANN); exploring GPU acceleration and data parallelization via and Spark on homemade Raspberry Pi cluster *[Python, Spark, numpy, PyCUDA]*

BaconNet 2015

Web app for classifying pictures of bacon and Kevin Bacon: isitbacon.net; built around a convolution neural network model fit to a sample of Google search images *[Python, Flask, Lasagne, HTML, CSS, JavaScript, Bootstrap, D3.js]*

MathWorkersJS 2015

Open-source parallel JavaScript math and statistics library built around HTML5 Web Workers and Node.js cluster library capable of speeding up computations on multi-core devices; accompanying documentation website: mathworkersjs.org, available for install on npm *[JavaScript, Node.js, HTML, CSS, Python, Flask, Apache Server]*

Personal Website 2013 – present

Full stack programming, dynamic blog: adrianlange.com *[HTML, CSS, JavaScript, Node.js, MySQL, Skeleton]*

Project Euler 2013 – present

Recreational mathematics/programming problems; currently solved more than 110 problems *[Python, C++]*

open source & community contributions

Python Cassandra Driver 2014

Simple error handling for input server connection list; python-driver *[Python, Cassandra]*

Q-Chem 2007 – 2014

Lead author of PCM solvent modeling, QM/MM, parallel linear algebra solvers, and Fast Multipole Method code; software design committee; 7th author of 161 co-authors on software white paper; Q-Chem *[C++, C, Fortran]*

LAMMPS 2013

Multi-copy communication interface to open-source molecular dynamics software for parallel tempering/replica exchange; optimized compute kernel for pairwise interactions; LAMMPS *[C++, C, MPI, OpenMP, Python]*

selected publications

Google Scholar Statistics: 500+ total citations, h-index 8, 12 first author papers, 1 book chapter

3 of 14 publications (PDFs available at adrianlange.com):

- Yihan Shao, Zhengting Gan, Evgeny Epifanovsky, Andrew T.B. Gilbert, Michael Wormit, Joerg Kussmann, Adrian W. Lange et al. Advances in molecular quantum chemistry contained in the Q-Chem 4 program package *Mol. Phys.* 1-32 (2014).
- Adrian W. Lange and Gregory A. Voth. Multi-state Approach to Chemical Reactivity in Fragment Based Quantum Chemistry Calculations *J. Chem. Theory Comput.* 9, 4018-4025 (2013).
- Adrian W. Lange, Gard Nelson, Christopher Knight, and Gregory A. Voth. Multiscale Molecular Simulations at the Petascale (Parallelization of Reactive Force Field Model for Blue Gene/Q): ALCF-2 Early Science Program Technical Report *Argonne National Laboratory* (2013).

awards & honors

Chair's Prime Choice in Computational Division at American Chemical Society Conference	2013
Presidential Fellowship from The Ohio State University Graduate School ($33,150)	2012
Chemical Computing Group Research Excellence Award from American Chemical Society ($1,150)	2012
U.S. Department of Energy Merit Scholarship for top poster presentation ($300)	2010
Ohio State Arts & Sciences Undergraduate Honors Research Scholarship ($3,500)	2006