Adrian Lange, PhD

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employment

Senior Data Scientist — June 2017 – Present
Sprout Social — *Chicago, IL*

- Development of data science/engineering systems to understand customer usage *[Python, Java, Javascript, Spark, ElasticSearch]*
- Created machine learning based search and recommendation engine for millions of articles shared on social media

Lead Data Scientist — September 2016 – June 2017
GE Transportation — *Chicago, IL*

- Generated descriptive and predictive analytics solutions for asset performance (*e.g.* fuel optimization, shipment tracking) utilizing machine learning and big data technologies *[Python, Java, PostgreSQL, Spark]*

Big Data Engineer, iTunes Analytics — May 2015 – August 2016
Apple — *Cupertino, CA*

- Developed data science/engineering methodology and analytics infrastructure to produce insights into customer experiences on products such as the App Store, Apple TV, and Apple Music *[Java, Python, Splunk, Cassandra, Spark, Hadoop]*

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

- Implemented data models, algorithms, and back-end services to build and analyze user profile networks for millions of daily users; managed NoSQL database with billions of records (~50 TB) *[Java, Cassandra, Python, Spark]*

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]*

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

- Researched quantum chemistry and statistical thermodynamics: mathematical theory, computation, and algorithms; published 10 journal articles; presented at 20+ professional/academic events *[C++, C, Fortran]*

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, Scala
Web Technologies	HTML, CSS/SCSS, Flask, Falcon, D3.js, React, Node.js, Jinja, jQuery, AJAX, web workers, AWS
Databases/Storage	Cassandra, SQL (PostgreSQL, Redshift, MySQL), Splunk, HDFS, Redis, ElasticSearch, Kafka
Data Analysis/Modeling	pandas, numpy, scikit-learn, SciPy, nltk, R, Keras, TensorFlow
Compute Technologies	Spark, Hadoop (MapReduce), Zeppelin, AirFlow, Superset, MPI, OpenMP
Productivity Tools	git, vim, IPython/Jupyter, VirtualBox, LaTeX, Charles, svn
Software Engineering	Test driven development, architecture design, scalability, code review, agile development, CI/CD
Machine Learning	Neural networks/deep learning, regression, clustering, matrix decomposition, tree methods, NLP, SVMs

education

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

Dissertation: *Multi-layer Methods for Quantum Chemistry in the Condensed Phase: Combining Density Functional Theory, Molecular Mechanics, and Continuum Solvation Models* (available here)

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, Deep 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

Particle Networks 2016 – present

Personal research project on neural networks, reformulating the weight matrix as a particle interactions; implemented analytic gradient and support for convolution, demo site: particle network *[Python, numpy]*

BrainSparks & Calrissian 2015 – present

Experimental deep learning library; supports MLP, 1D convolution net, exploring GPU acceleration, data parallelization via Spark on homemade Raspberry Pi cluster *[Python, Spark, numpy, PyCUDA]*

BaconNet 2015

Web app for classifying pictures of bacon and Kevin Bacon, formerly hosted at http://www.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: formerly hosted at www.mathworkersjs.org, available 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, Flask, Skeleton, nginx]*

Project Euler 2013 – present

Recreational mathematics/programming problems; currently solved more than 110 problems; 99th percentile *[Python]*

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: 1000+ total citations, h-index 9, 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
American Society for Microbiology Undergraduate Research Fellowship ($4,000)	2006
Ohio State Arts & Sciences Undergraduate Honors Research Scholarship ($3,500)	2006