Dr. Strangelange or:
How I Learned to Stop Worrying and Love the Tech Startup Industry

Adrian Lange
Industrial Associates Meeting
University of Chicago
April 29, 2014

Questions

- Who am I?

- Where do I work?

- What do I do there?

- Why do I work there?

- How did I get there?

Who?

- Back-end software developer at BrightTag, Inc. (2013 - current)

- Postdoctoral Appointee at Argonne National Laboratory Leadership Computing Facility / University of Chicago (2012-2013)

- Ph.D. Computational/Physical Chemistry from The Ohio State University (2007-2012)

- Academic scorecard: 12 publications (all 1st author, 1 JACS, 300+ citations, h-index 6), paper in review, book chapter pending, co-author of Q-Chem v4.0, 20+ presentations, various awards/honors

Where?
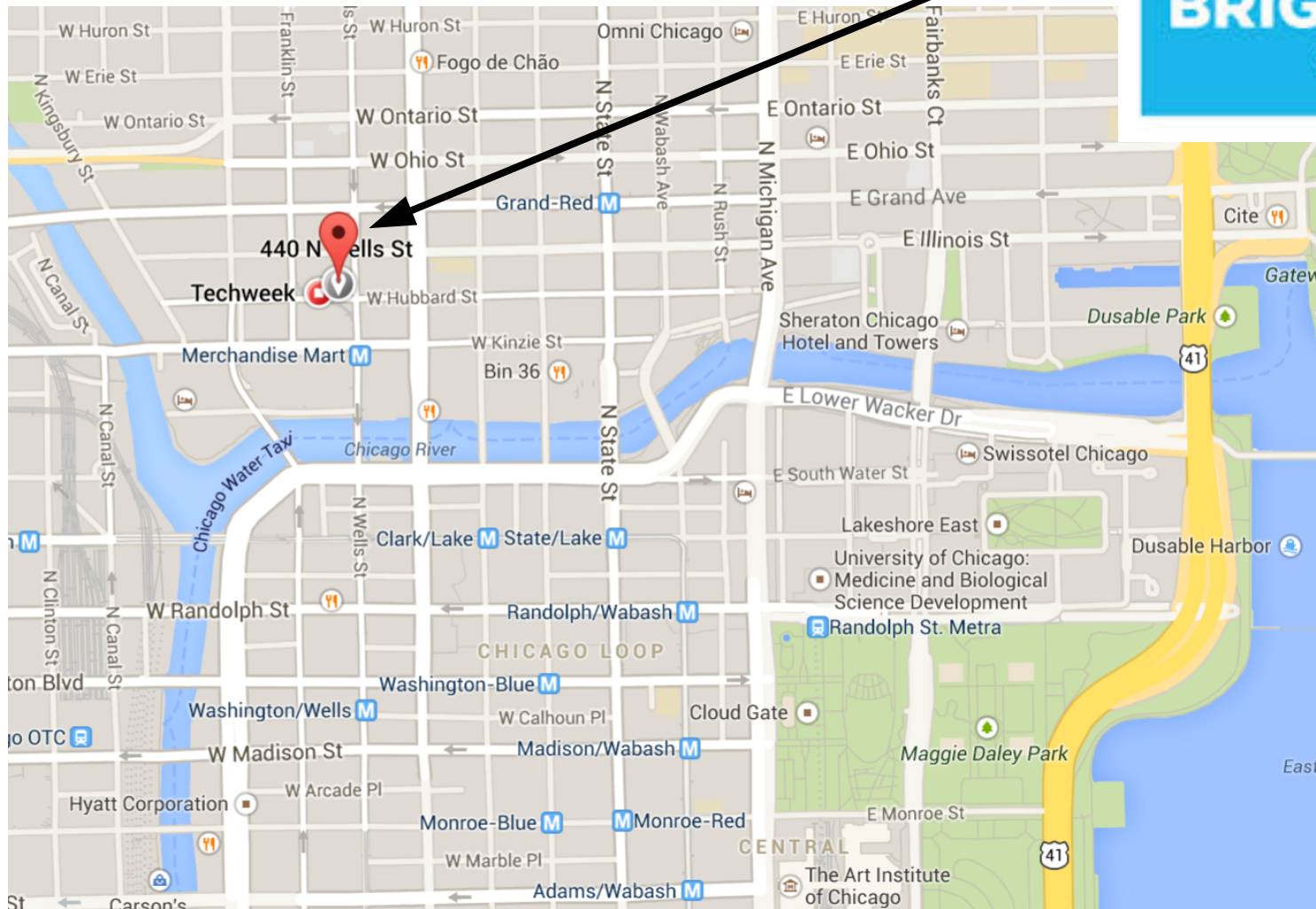
Where?

- Software tools for marketing, web analytics, data collection (web tracking), and ad networking

- Notable clients

Where?

- Software tools for marketing, web analytics, data collection (web tracking), and ad networking

- Tag Management System

  – Single tag on webpage available to all partner vendors

  – Vendors integrated server-side (patented technology)

  – Data available in real-time

- Fuse

  – Multi-channel and server-direct data collection

What?

- Back-end, database modeling and algorithms
  - Cassandra NoSQL database (over a billion records)
  - Amazon Web Services server hosting (500+ servers)
  - Server-side performance (3000 queries/second)
  - Languages: Java, Python, bash, JavaScript
- Hack project: real-time anomaly detection/traffic forecasting system
  - On-the-fly Fourier analysis

Why?

- Disenchanted with academic research

  – Assistant professor? Nope.

- National labs

  – Sequester, shutdown, middle of nowhere

- Industry jobs?

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job title, keywords or company

where:

city, state, or zip

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Jobs 1 to 10 of 73

Why?

- Disenchanted with academic research

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  - Sequester, shutdown, middle of nowhere

- Industry jobs?

  - Very few, odd locations, mostly pharmaceutical and not my expertise, several non-permanent (postdocs)

  - Applied for a few, rejected!

Why (leave chemistry)?

- Complex question with no single answer.

- Existential crisis + imposter syndrome

    - High stress, incredibly esoteric, general unhappiness

    - Getting older, people are dying

    - Want fulfilling life, the pursuit of happiness

- Two-body problem: I'm married.

    - Could become many-body problem with children

- Epiphany:

    - I am smart. I can do things. I will not pigeonhole myself.

Why (leave chemistry)?

- What am I good at that is actually in demand?

- Tech startups appealing to me

  - Chicago has a bubbling little scene

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How?

- Diversify skill set
  - Learn things listed in job descriptions
    - Online courses (Coursera, Udacity, etc.), books
- Create web presence
  - LinkedIn, GitHub, BuiltInChicago
  - Built web app for personal site (adrianlange.com)
- Resumé
  - Not a CV, 1 page, well organized, no typos
  - Tailor to each job applied to
  - Accomplishments, not responsibilities

How?

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EMPLOYMENT

Postdoctoral Appointee	**Argonne National Laboratory** **Leadership Computing Facility**	**March 2012 – Present**

- Developed novel algorithms for massively parallel chemistry simulations on IBM Blue Gene/Q supercomputer
- Increased simulation code speed more than 8x, scalability to ~0.4 million cores (C++, C, Python, MPI, OpenMP)
- Created quantum proton transport model, implemented in Newtonian dynamics interface code (Python, C++, MPI)
- Assisted University of Chicago research group and workshop attendees with running/improving code

Ph.D. Student Researcher	**The Ohio State University**	**June 2007 – March 2012**

- Published 10 first author journal articles, 230+ total citations, h-index 6 (for listing, see my Google Scholar Citations)
- Presented quantum chemistry research orally over 20 times at professional events/conferences
- Invented new mathematical model for solvent electrostatics, new algorithm for building molecule surfaces
- Implemented force fields, solvent models, parallel linear algebra solvers in Q-Chem (C++, C, Fortran, MPI, OpenMP)
- Led recitations and conducted exams as teaching assistant for physical chemistry courses

EDUCATION

Columbus, OH	**The Ohio State University**	**August 2003 – March 2012**

- **Ph.D.** Computational/Physical Chemistry, March 2012 (GPA: 3.65)
- **B.S.** Chemistry with minor in Microbiology, June 2007 (GPA: 3.39)
- **Coursework**:
  - Graduate/Undergraduate: Quantum mechanics, Statistical mechanics, Computational chemistry, Multivariable calculus, Linear algebra, Differential equations, Computer programming, Numerical methods
  - Udacity (online): Web development, GPU programming, Programming languages
  - Coursera (online): Machine learning, Data science, Algorithms, Databases

TECHNICAL SKILLS

- **Proficient**: C++, C, Python, Unix/Linux shell (csh, bash), awk, OpenMP, MPI, LaTeX
- **Familiar**: HTML, CSS, JavaScript, jQuery, SQL, Java, Fortran, Pthreads, CUDA, CVS, SVN, git

ADDITIONAL EXPERIENCE/PROJECTS

View some code I have written at GitHub: https://github.com/awlange

- **Q-Chem v4.0** (2009–2013): Lead author of polarizable continuum model and QM/MM codes in commercial software package, Q-Chem; one of six software design committee members (C++, C, Fortran)
- **LAMMPS Ensembles** (2013): Multi-copy communication interface to open-source software, LAMMPS; contributions to main LAMMPS source code (C++, C, MPI, OpenMP, Python)
- **Personal Webpage** (2013): http://scientistdeveloper.appspot.com/ (HTML, CSS, JavaScript, jQuery, Python)
- **FMO-MS-RMD** (2013): Proton transport fragment simulator; interfaced with Q-Chem (Python, C++, MPI)
- **DESMO** (2011): Highly parallel solvent model code; genetic algorithm dynamic load balancing (C++, OpenMP, MPI)

HONORS AND AWARDS

- Chair's Prime Choice presentation in Computational Division at American Chemical Society Conference (2013)
- Presidential Fellowship from The Ohio State University Graduate School (2011–2012; $33,150)
- Chemical Computing Group Research Excellence Award from American Chemical Society (2012; $1,150)
- Travel Fellowship to present at American Conference on Theoretical Chemistry (2011; $600)
- U.S. Department of Energy Merit Scholarship for top poster presentation (2010; $400)
- American Society for Microbiology Undergraduate Research Fellowship (2006; $4,000)
- Ohio State Arts & Sciences Undergraduate Honors Research Scholarship (2006; $3,500)

How?

- Tech interviews
  - Phone screen, face-to-face meeting, multi-hour exam
    - Whiteboard coding, algorithms, software design, brain teasers
    - Show knowledge as well as thought process
    - Personality matching
  - "Cracking The Coding Interview" by Gayle Laakmann McDowell, search online for interview questions
  - Practice, study... just like any other exam
- Beyond
  - Wing it

Questions?

- Find me afterward for further questions

- Or, email me: adrian.w.lange@gmail.com

(me smiling at work)

(whiskey)