Carl A. Fahlstrom, PhD

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Objective: Software Engineer

Education

Montana State University, Bozeman, MT
2016

- PhD in **Physical Chemistry**
- **Title:** Computational Prediction and Experimental Measurement of Time Resolved Fluorescence Properties of Tryptophan and 5-Fluoro-Tryptophan Dipeptides

Eastern Oregon University, LaGrande, OR
2003

- Bachelor of Science in **Chemistry**
- Bachelor of Science in **Physics**

Career Summary

I have over 5 years experience developing tools in Python; 2 years of web application development. I have over 12 years of experience in optical spectroscopy and computational sciences. Thought out my research career I have built my own data analysis tools in Python. My experiences include collaborative projects in government labs, academia, and private industry. At xformatics, I took primary responsibility for full stack development.

Programming Languages

Python	JavaScript
MATLAB	C++
Objective-C	PHP
FORTRAN	SQL
Bash shell	HTML

Embedded Development

Linux on Beaglebone Black

Arduino

PICmicro MCUs - C and assembly

Notable Frameworks & Libraries

Node.js	jQuery
Express	SciPy
Numpy	

Professional Experience

Software Engineering Consultant   *8/2013 – present*
xformatics - Belgrade, MT and San Francisco, CA

- Developed web application for scientific data collection.
- Contributed to both back-end development using Node.js and MySQL as well as front-end development and design using JavaScript, HTML, and CSS.
- Development for embedded Linux platform.
- Set up Amazon AWS EC2 instances for back-end services (Node.js, MySQL).
- Provided insight into customer needs in a chemistry laboratory.
- Provided consulting in electronic hardware design.

Graduate Research Assistant / Teaching Assistant   *1/2016 – 5/2016*
                                                            9/2005 – 9/2012

Montana State University - Bozeman, MT

- Conducted computational and spectroscopic studies of normal and misfolded Prion protein.
  - Predicted fluorescence quantum yield with QM/MM simulations.
  - Measured quantum yield and fluorescence lifetimes.
  - Evaluated model structures of the disease state.
- Aligned, maintained, and operated optical systems including interferometers, pulsed and CW lasers.
- Operated electronic instrumentation for data collections and system diagnostics.
- Conducted molecular dynamics simulations of proteins.
- Developed software for method development and data processing in Python, MATLAB, and FORTRAN.
- Wrote scientific papers and prepared and delivered presentations on work.
- Utilized MD simulations to determine peptide conformation and dynamics.
- Prepared and delivered pre-lab lecture; supervised students in laboratory, answered questions from students; graded lab reports.

Laser Engineering Consultant   *6/2015 - 12/2015*
Sensopath Technologies, Inc - Bozeman, MT

- Installed and operated Spectra-Physics Solstice femtosecond laser system.
- Designed custom electronics and embedded software solution for motion control of 2D microscope stage.

Chemist   *9/2012 – 1/2013*
Zinc Air Inc - Columbia Falls, MT

- Conducted chemistry and materials science research activities in support of flow battery development.
- Designed experiments and constructed experimental apparatuses for determination of contamination mechanisms in flow batteries.
- Analyzed electrolyte samples by titration, UV-VIS, FTIR, and atomic absorption.
- Prepared research reports and presentations for the research and development group.

Web Technologies

HTML 5	XHTML	XML
CSS 3	Amazon AWS	Canvas
MySQL	REST API	SOAP API

Source Control & Development Tools

Git	GitHub
Mercurial (Hg)	Bitbucket
Subversion (SVN)	Xcode
GCC	Make

HPC - NSF XSEDE, OpenMP, MPI

Computational Software

NWChem	GAMESS
Gromacs	CHARMM
Gaussian	

Research Associate *4/2011 – 7/2011*
SensoPath Technologies, Inc. - Bozeman, MT
- Set up optical layout for the irradiation of tumors of live mice with laser system.
- Participated in software development for operation of 2D microscope stage.
- Aligned, maintained, and operated laser system.

Graduate Teaching Assistant *9/2004 – 6/2005*
Northwestern University - Evanston, IL
- Prepared and delivered pre-lab lecture.
- Supervised students in laboratory and answered questions.
- Graded lab reports.

PNNL Undergraduate Fellow *Summers 2000 - 2003*
Pacific Northwest National Laboratory - Richland, WA
- Developed software and conducted computational research.
    - Theoretical studies, using DFT, of IR spectra of Hg-alkane complexes. Compared to experiment to assign vibrational modes.
    - Interfacing NWChem to CCA Component Framework (Java Programming).

Related Volunteer Experience

Research Assistant (Volunteer Position) *1998 - 2003*
Eastern Oregon University Chemistry Department / ODFW Fish Pathology Laboratory
- Conducted research involving bacterial kidney disease in juvenile salmon.
- Preformed ELISA and Immunofluorescence assays.
- Applications of SW-NIR spectroscopy in biological tissue.
- Preformed multivariate analysis (PCA, PLS) on spectroscopic data sets.
- Conducted experiments using time resolved spectroscopy (photon time of flight).

Physics Department Systems Administrator 2002-2003
Eastern Oregon University
- Installed and maintained Linux and Windows machines for two laboratories.
- Configured Linux-based thin clients.
- Setup shared network file system.

Selected Papers and Presentations

- C. Spangler, J. Starkey, G. Dubinina, A. Rebane, M. Drobizhev, **C. Fahlstrom**. Optimization of a two-photon-activated porphyrin PDT agent incorporating imaging and targeting moieties for the treatment of head and neck cancers. Photodiagnosis and Photodynamic Therapy. Volume 8, Issue 2 , Pages 195-196, June 2011.
- B. Inberg, **C. Fahlstrom**, L. Dobeck, L. H. Spangler, and S. R. Shaw, "Enhanced Step-Mode FTIR Position Control," in Fourier Transform Spectroscopy/ Hyperspectral Imaging and Sounding of the Environment, OSA Technical Digest Series (CD) (Optical Society of America, 2007), paper FWA6.
- Kenny JP, Benson SJ, Alexeev Y, Sarich J, Janssen CL, McInnes LC, Krishnan M, Nieplocha J, Jurrus E, **Fahlstrom C**, Windus TL, Component-based integration of chemistry and optimization software. Journal of Computational Chemistry 25 (14) 1717-1725 (2004).
- Jorge Garza, **CA Fahlstrom**, Rubicelia Vargas, JA Nichols and DA Dixon. Orbitals from molecular orbital and density functional theories for ionic systems. In Reviews in Modern Quantum Chemistry, K.D. Sen (Ed.). World Scientific, Singapore (2002).
- **CA Fahlstrom**, GD Gillispie, PR Callis, LH Spangler. Fluorescence of Trp-X, X-Trp and 5-fluoro-tryptophan dipeptides. Northwest Regional Meeting of the American Chemical Society. June 21st 2010. (Oral presentation)
- **CA Fahlstrom**, J Gilbert, MA McGuirl and PR Callis. Experimental and Computed Fluorescence in Single-Trp Mutants of Normal and Modeled Disease-like Prion Protein. Biophysical Journal 94 (2 Supplement 1) p548-553. (2008). (poster)