Joshua Richer

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Profile

I'm a scientist with training in **computer science, statistics, and biology**. I work with high dimensional data on clustering, classification and modeling problems for disease diagnostics. Computing to me is a hobby as well as a profession, and I constantly work on improving my skills through reading and contributing to open source projects. I seek and would thrive in an interdiciplinary, team oriented and technical environment. See github (https://github.com/joshuaar) or linkedin (https://linkedin.com/in/joshuaar) for more details.

Skills

Analytical Skills, Experience in **supervised and unsupervised machine learning**, genomics data analysis, high dimensional data, multivariate and nonparametric statistics, data visualization in R and Python, Schema design, Object Oriented Programming, Functional Programming.

Languages, Python, R, Scala, Java, C++, Javascript.

Software/Libraries, Linux, ElasticSearch, Apache Spark, Apache Lucene, Vim, Git, Illustrator.

Experience

12.2014-Present — **Orion Health**, *Software Engineer*, Scottsdale, AZ.
Designing analytics systems that analyze millions of patient records to solve population health problems.
- Designed and wrote **Spark Jobs** for indexing millions of patient records in a data warehouse based on elasticsearch.
- Designed a **pilot study** aimed at predicting hospital readmission risk given certain clinical variables.
- Present machine learning topics to a group of engineers.

01.2014-12.2014 — **USDA Agricultural Research Service**, *Bioinformatics Specialist*, Maricopa, AZ.
Fixed term appointment to set up and ran a small informatics core facility focusing primarily on **genomics** (RNA-Seq) in insects.
- Built a **web interface** exposing tools for parallel processing of genomics data to research scientists.
- **Designed an analysis pipeline** available on Galaxy for de-novo transcriptome assembly, annotation, searching and visualization. Used by three participating research groups.
- Support and parallelization of FORTRAN code for radiative transfer atmospheric models.
- Write XML and cheetah templates for use with the Galaxy bioinformatics suite.

08.2010- 12.2014	**Biodesign Institute**, *Research Associate*, Tempe, AZ. Conducted research projects involving high density peptide microarrays. I designed experiments, **algorithms and software** for the Immunosignature technology (http://en.wikipedia.org/wiki/Immunosignature). - Wrote non-parametric (bootstrapping) validation procedures for a an immunosignature based Dengue Fever diagnostic. Includes **feature selection, SVM classification, cross validation, ROC analysis** and visualization. I packaged this into a command line application which became standard protocol in the lab. - Designed and tested a system for rapidly mapping B-Cell epitopes from human sera and monoclonal antibodies. Includes a novel **statistical algorithm** for epitope determination from noisy sequence data. - Designed and built a rapid pattern search engine for biological sequences using **Apache Lucene and Scala**. It is over 100x faster than naive methods, and useful for identifying peptide motifs in large sequence databases. Includes **trigram index, pattern compiler, web interface**.
2009-2010	**Entech**, *Quality Control Engineer*, White Pigeon, MI. Directed quality control for a recycling plant specializing in tire rubber for artificial turf, molding and extrusion. - Built and supported a database for QC results with **nightly backups to offsite storage**. - Wrote procedures creating formatted reports for management. - Technologies used: PostgreSQL, Python, Excel - Ensured data and product samples were available and accurate, which was important for occasional disputes over quality.
01.2009- 07.2009	**University of Notre Dame**, *Research Visitor*, Notre Dame, IN. Research internship at UND in the lab of Dr. Paul Helquist. Synthesized TSA analogs for treatment of Niemann-Pick disease, co-authoring two papers in peer reviewed journals.

Education

2010-Present	**Arizona State University, Ira. A. Fulton School of Engineering**, *Ph.D, Biological Design (conc. Bioinformatics)*, Tempe, AZ.
2005-2009	**Goshen College**, *B.A, Chemistry, Mol. Biology*, Goshen, IN. **Quantitative Coursework (Selected)**. - Nonparametric Statistics - Linear Regression - Statistical Computing - Data Structures and Algorithms - Theoretical Computer Science - Operating Systems - Assembly Language Programming

Publications

Josh Richer, Stephen Johnston, and Phillip Stafford. Epitope identification from fixed-complexity random-sequence peptide microarrays. *Molecular and Cellular Proteomics*, Accepted with minor revisions.

Josh Richer, Xiao Wang, and Stephen Johnston. Immunosignatures for dengue diagnosis. Manuscript in Preparation.

Joe Hull, Josh Richer, and Jeffrey Fabrick. Sequencing and de novo assembly of the western tarnished plant bug (lygus hesperus) antennal transcriptome. Manuscript in Preparation.

Casey Cosner, Vijaya Bhaskara, Anamitra Chaterjee, John Markiewicz, Steven Corden, Joakim Lofstedt, Ankner Tobias, Joshua Richer, Tyler Hulett, Douglas Shauer, Olaf Wiest, and Paul Helquist. Evolution of concise and flexible synthetic strategies for trichostatic acid and the potent histone deacetylase inhibitor trichostatin a. *European Journal of Organic Chemistry*, 2013(1):162–172, 2013.

Anamitra Chatterjee, Joshua Richer, Tyler Hulett, Vijaya Bhaskara Reddy Iska, Olaf Wiest, and Paul Helquist. An efficient synthesis of (±)-trichostatic acid and analogues: A new route to (±)-trichostatin a. *Organic letters*, 12(4):832–834, 2010.

Contact

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