

James Jeffries



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Education

Doctor of Philosophy 2017(anticipated)	Northwestern University Evanston, IL Chemical Engineering, Advised by Keith Tyo & Christopher Henry
Bachelor of Science May 2012	Rose-Hulman Institute of Technology Terre Haute, IN Chemical Engineering & Biochemistry and Molecular Biology, <i>Magna Cum Laude</i>

Experience

Aug 2016 Nov 2016	Data Science & Computational Biology Intern at Intrexon Corporation <i>Industrial Products Division</i> , South San Francisco, CA <ul style="list-style-type: none">Developed a pipeline for aggregation, annotation and prioritization of enzymes with novel biosynthetic potential.Cleaned, parsed and utilized substrate and reaction data from external databases.Built and deployed a containerized Flask microservice, bringing analysis results directly to wet-lab scientists.Constructed visualizations for complex, hierarchical, and heterogeneous biological data.
Since Mar 2013	Graduate Research Assistant at Argonne National Laboratory <i>Mathematics and Computer Science Division</i> , Lemont, IL <ul style="list-style-type: none">Collaborated in a cross-functional team including plant biologists and analytical chemists to uncover novel enzyme functions and the resulting metabolic products.Generated computational predictions of enzymatic and spontaneous chemical activities to build a searchable databases of putative metabolites.Implemented a API in Python to enable database integration into Department of Energy Biological Knowledge Base and 3rd party workflows.Co-developed and maintained an AngularJS web application at minedatabase.mcs.anl.gov to facilitate broad use of the metabolite database.
Summer 2011	Summer Research Student at Colorado St. University <i>Colorado Center for Biofuels and Biorefining</i> , Fort Collins, CO <ul style="list-style-type: none">Constructed a partial astaxanthin synthesis pathway in <i>E. coli</i> with cloning techniques and performed homologous recombination in <i>Synechocystis</i>.Adapted a carotenoid extraction protocol for <i>Synechocystis</i> to enable quantitative HPLC analysis.

Technical Skills

Data Science	Python, Machine learning with scikit-learn & dask, Cluster computing, MongoDB, SQL, Spotfire
Bioinformatics	BLAST & Multiple sequence alignment, Ancestral sequence reconstruction, Homology modeling
Cheminformatics	QSAR modeling, Compound & reaction database design, ChemAxon suite, OpenBabel, RDKit
Web Development	APIs and microservices with Flask & Docker, JavaScript, Angular.js, Node.js, Protractor testing

Selected Awards

2016	Data Smackdown Champion <i>Enova International</i>	2014 - 2015	Fellowship in Leadership <i>Northwestern University</i>
2015	NIH Travel Grant <i>Metabolomics Society</i>	2013	Outstanding Teaching Assistant Finalist <i>Northwestern University</i>

Research Communication

Publications

1. O. Frelin, L. Huang, G. Hasnain, **J. Jeffryes**... A. Hanson "A novel directed-overflow and damage-control N-glycosidase in riboflavin biosynthesis" *Biochem. J.* **466**, 137-145 (2015)
2. **J. Jeffryes**, R. Colestani, M. El-Badawi, T. Kind... C. Henry "MINEs: Open access databases of computationally predicted enzyme promiscuity products for untargeted metabolomics" *J. Cheminformatics* **7**:44 (2015)
3. C. Lerma-Ortiz*, **J. Jeffryes***, A. Cooper... C. Henry & A. Hanson "Nothing of chemistry disappears in biology": The Top 30 damage-prone metabolites *Biochem. Soc. Trans.* **44**, 961-71 (2016) **these authors contributed equally to this work*
4. D. Pertusi, M. Moura, **J. Jeffryes** & K. Tyo "Elucidating substrate-level enzymatic promiscuity using cheminformatic methods" *Metabolic Engineering* In Review
5. **J. Jeffryes** C. Lerma-Ortiz A. Golubev... K. Tyo & C. Henry "CD-MINE: a database of curated and predicted spontaneous metabolic reactions" *ACS Synthetic Biology* In Preparation

Select Conference Presentations

1. **J. Jeffryes**, C. Lerma-Ortiz, T. Niehaus... C. Henry *Mining metabolism for unannotated enzymatic functions and serendipitous metabolic pathways* Poster Presentation at **Metabolic Engineering 11** June 27, 2016
2. **J. Jeffryes**, C. Lerma-Ortiz, A.J. Cooper... C. Henry *Detection of novel metabolites and enzyme functions through in silico expansion of metabolic models* Oral Presentation at **251st American Chemical Society National Meeting & Exposition** March 13, 2016
3. **J. Jeffryes**, R. Colestani, M. El-Badawi, T. Kind... C. Henry *MINEs: Open access databases of computationally predicted enzyme promiscuity products for untargeted metabolomics* Oral Presentation at **11th International Conference of the Metabolomics Society** July 2, 2015

Teaching Experience

Leadership Coach	Worked with undergraduate students to identify and overcome leadership challenges in their organizations though one-on-one mentoring organized by Northwestern University's Center for Leadership.
Workshop Instructor	Developed and taught a 2-day workshop on cheminformatics and MINE databases for graduate students, postdoctoral fellows, and faculty from University of Florida and University of California-Davis
Research Mentor	Advised Tom Aunins, a Chemical Engineering undergraduate student, in writing a successful Undergraduate Research Grant application and conducting summer research.
Teaching Assistant	Kinetics, Energetics & Bioreactor Design, 3 quarters. Paradigms & Strategies of Leadership, 1 quarter Computational Biology, 1 quarter