

# Ronald J. Nowling

5927 W Beloit Rd.  
West Allis, WI 53219  
[rnowling@gmail.com](mailto:rnowling@gmail.com)  
<http://www.github.com/rnowling>  
954.496.2314

## Education

University of Notre Dame, Notre Dame, IN

- Ph.D. Candidate in Computer Science & Engineering
- M.S. in Computer Science & Engineering

August 2010 – Present  
(Expected) Fall 2015  
(Expected) Spring 2015

Eckerd College, St. Petersburg, FL

- B.S. Computer Science, Mathematics
- Thesis: *Nature-inspired Metaheuristics for Combinatorial Optimization Problems*

August 2006 – May 2010

## Skills

- Fields: Software Engineering, Math Modeling, Machine Learning, Computational Physics, Bioinformatics, Distributed Systems, Open Source
- Programming Languages: Python, Java, Go, C/C++, Scala, Clojure, Erlang, bash, Matlab, SQL
- Software Engineering:
  - Paradigms: Object-oriented, Functional, Distributed, Parallel, and GPU programming
  - Testing: Unit Testing (Python unittest, JUnit, ScalaTest), Continuous Integration (Jenkins)
  - Version Control: Git, Mercurial, SVN
  - Build Systems: Gradle, sbt, Maven, lein, CMake
- Distributed and Parallel Frameworks: Spark, Mesos, Condor, SGE, MPI, CUDA
- Infrastructure: Docker, Vagrant, AWS, OpenStack, Ansible
- Databases: MySQL, SQLite

## Professional Experience

Software Engineer, Red Hat, Inc., Raleigh, NC

- Internal analytics projects
- RPM packaging, integration testing, and deployment of internal analytics stack
- Provisioning, configuration, and administration of clusters
- Contributor to Apache Spark and Apache BigTop projects

June 2014 – Present

Committer, Apache Bigtop

March 2015 – Present

Research Assistant, University of Notre Dame, Notre Dame, IN  
GAANN Fellow (Fall 2012 – Spring 2014)

August 2010 – Present

|   |                           |
|---|---------------------------|
| <u>Teaching Assistant</u> , University of Notre Dame, Notre Dame, IN<br>Received Kaneb Center Outstanding Teaching Assistant Award (2012) | August 2010 – May 2013    |
| <u>Simbios OpenMM Visiting Scholar</u> , Stanford University, Stanford, CA  | July 30 – August 24, 2012 |
| <u>Undergraduate Research Assistant</u> , University of Connecticut<br>Farmington, CT   | Summers 2005 – 2010       |
| <u>Ford Scholar and Research Assistant</u> , Eckerd College,<br>St. Petersburg, FL  | Summer 2007 – Spring 2010 |

### **Selected Modeling and Analytics Projects**

- BigPetStore Data Generator – Stochastic, dynamical math model and generator for transaction data with temporal and geospatial patterns for a fictional chain of pet stores.
- Stochastic differential equations (SDEs), numerical integration schemes, and numerical linear algebra algorithms for modeling and simulation of biomolecules and liquids.
- Analysis of terabyte-sized, very-high-dimensional molecular simulation data using Markov State Models (MSMs), network models, and statistical mechanics.
- HMM-based classifiers and pipelines for annotating genes in insect genomes.
- Nature-inspired approximation algorithms for combinatorial optimization problems.
- Math model for predicting performance bottlenecks in Folding@Work, framework for running thousands of molecular dynamics simulations in parallel.

### **Selected Open Source Contributions**

- Apache Spark – (Scala, Python) Improvements to machine learning algorithms, data generators, tests, and documentation. <http://spark.apache.org/>
- Apache BigTop – (Scala, Java) Spark version of BigPetStore, including data generator driver, analytics examples, tests, and documentation. <http://bigtop.apache.org/>
- BigPetStore Data Generator – (Java, Python) Stochastic math model and simulation for generating synthetic transaction data. <https://github.com/rnowling/bigpetstore-data-generator>
- ProtoMol – (C++) Implemented numerical algorithms for molecular dynamics simulations. <http://sourceforge.net/projects/protomol/>
- OpenMM LTMD – (C++/CUDA) Validated and improved GPU-based molecular dynamics simulation methods. <https://github.com/LCLS/LTMDOpenMM>
- DARWIN – (C++) Replaced custom binary file format with SQLite relational database in software for semi-automatic identification of dolphins using computer vision techniques. <http://darwin.eckerd.edu/>

### **Selected Software Engineering Projects**

- CONNJUR Spectrum Translator – (Java) Designed and implemented universal file format converter for Nuclear Magnetic Resonance data. <http://connjur.uchc.edu/downloads/st/>

- CONNJUR Workflow Builder – (Java) Integrated command-line tools with database-driven, visual-programming environment for Nuclear Magnetic Resonance data processing. <http://connjur.uchc.edu/downloads/wb/>
- MIMOSA – (Java) Information management system for annotation of short amino-acid sequences from papers. <http://www.bio-toolkit.com/MimoSA/project/>
- Solar System Simulator – (Python) Plugin-based framework for simulating solar bodies by numerically integrating Newton's equations of motion. (Available upon request.)

## Publications

\* denotes equal contribution

**RJ Nowling** and J Vyas. “A domain-driven, generative data model for BigPetStore.” *Proceedings of the 4<sup>th</sup> IEEE International Conference on Big Data and Cloud Computing*, 2014.

JC Sweet, **RJ Nowling**, TM Cickovski, CR Sweet, VS Pande, and JA Izaguirre. “Long Timestep Molecular Dynamics on the Graphical Processing Unit.” *J. Chem. Theory Comput.*, 9(8):3267–3281, 2013.

**RJ Nowling\***, JL Abrudan\*, DA Shoue, B Abdul-Wahid, M Wadsworth, G Stayback, FH Collins, MA McDowell, and JA Izaguirre. “Identification of Novel Arthropod Vector GPCRs.” *Parasit. Vectors*, 6:150, 2013.

HJC Ellis, G Weatherby, **RJ Nowling**, J Vyas, M Fenwick, and MR Gryk. “A Software Architecture for NMR Spectral Data Translation.” *CISE*, 15(1):76-83, 2013.

**RJ Nowling** and TM Cickovski. “Prototype to Release: Software Engineering for Scientific Software.” *Biomedical Computation Review*, Fall 2012.

**RJ Nowling**, J Vyas, G Weatherby, MW Fenwick, HJC Ellis, and MR Gryk. “CONNJUR Spectrum Translator: An open-source application for reformatting NMR spectral data.” *J Bio NMR*, 50:83-89, 2011.

**RJ Nowling** and H Mauch. “Priority Encoding Scheme for Solving Permutation and Constraint Problems with Genetic Algorithms and Simulated Annealing.” *Proceedings of the 8th International Conference on Information Technology - New Generations*, 2011.

HJC Ellis, J Vyas, **RJ Nowling**, TO Martyn and MR Gryk. “Iterative Development Of An Application To Support Nuclear Magnetic Resonance Data Analysis Of Proteins.” *Proceedings of the 8th International Conference on Information Technology - New Generations*, 2011.

J Vyas\*, **RJ Nowling\***, T Meusberger, D Sargeant, K Kadaveru, MR Gryk, V Kundeti, S Rajasekaran, and MR Schiller. “MimoSA: a system for minimotif annotation.” *BMC Bioinformatics*, 11:328, 2010.

J Vyas, **RJ Nowling**, MW Maciejewski, S Rajasekaran, MR Gryk, and MR Schiller. “A proposed syntax for Minimotif Semantics, version 1.” *BMC Genomics*, 10:360, 2009.