# Jonathon B. Ferrell

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## Summary


- Recent PhD graduate in computational biophysics.
- Very strong adaptability due to a broad background in a variety of fields.
- Interested in fast paced environments that require quick thinking and adaptability.


## Professional Experience

**Software Development**
**Gained as a Self Employed Contract Worker**

- Investigation of existing code base leading to discovery of catastrophic problem with outdated APIs. Proposed, developed, and deployed a fix in a short time frame in order to stabilize the company's software platform.
- Became proficient in the organizations chosen language of Scala with no pre-existing experience in parallel with investigation of code base.
- Worked directly with clients to replace the previous mentioned software with a new NodeJS based variant adding better long term support and resolving pre-existing issues.

**Machine Learning Model Creation**
**Gained as a Graduate Research Assistant at University of Vermont**

- Beginning to end creation of a deep neural network coarse grain potential for biomolecules, including generation of data, hyper-parameter optimization etc.
- Partnered creation of a back mapping network which predicts atomic positions of atoms in a protein from a coarser representation. Contribution includes working on chemical representation, theory crafting, and network design and training.
- Collaborative creation of a GAN network with a machine learning expert. Specifically assisting in creation and curation of the data, as well as refining and improving the network, and supplying support post prediction with the discovery of two novel anti-microbial peptides.

**Project Management**
**Gained as a Graduate Research Assistant at University of Vermont**

- Completed a project to modernize a computational chemistry lab by acquiring hardware, training current and future lab members, setting up new protocols and documentation in order to transition the lab to GPGPU compute based methods. Extended to a university effort to acquire a local GPU cluster including being a member of the grant committee, testing the hardware upon acquisition, and working with stakeholders on documentation and software for the entirety of the campus.
- Lead the lab's pandemic approach including assisting in preparing necessary procedures to continue work during a shutdown, continued support during, and the creation of collaborative web based documentation to allow students to share knowledge on how to best handle technical challenges during the shutdown.
- Designed an educational component to an organic chemistry lab using VR. This included acquisition of VR equipment, software testing, working with educators on coarse design and best way to include, leading to a published paper showing improved student performance. Pre-pandemic, was involved in further efforts to integrate into other courses with newer software.

**Collaborative Communication**
**Gained as a Graduate Research Assistant at University of Vermont**

- Worked as a liaison between a computational chemistry, biology, and computer science group using knowledge of all three fields to make communication as easy as possible leading to the publishing of a paper and funding of a grant.
- Presented to a group of chemist collaborators to explain how computational chemistry worked and education them on the limitations of different approaches in a way they understood and appreciated.
- Tasked to be an ambassador of the local compute cluster at a machine learning workshop hosted by the cluster to present the power and utility of the cluster as well as machine learning.

## Technical Skills

- NodeJS
- Javascript
- Scala
- Python
  - Numpy
  - Pandas
  - Numba
- git
- Tensorflow
- CUDA
- Biologically Applied Neural Networks
- Deep Potential Neural Networks
- Data Mining
- Force Field Development
- Molecular Dynamics
- Schrödinger Suite
- Amber Suite
- Pymol

## Education

**Ph.D. Cellular, Molecular and Biomedical Sciences; University of Vermont; Burlington; VT** *2023*
Dissertation: "Biochemical Combinatorics Through Coarse Grain Neural Network Potentials, DNA Nanocages, & Virtual Reality"
Selected Courses: Combinatorial Graph Theory; Random Graph Theory; Proteins I: Structure & Function

**B.S. Physics/Biology; University of Tennessee Knoxville; Knoxville, TN** *2017*
Selected Courses: Unconventional Computation; Structure of Matter;

## Awards

- Outstanding Young Researcher Award 2018
  From Computational Biophysics to Systems Biology
- Outstanding Graduate - Physics 2017
  University of Tennessee, Knoxville
- Consulate-General Award 2016
  Tennessee Area Japanese Speech Contest

## Hobbies

- Music both listening, I have the most eclectic tastes, and playing (mainly piano though I am woefully out of practice).
- Cooking, everything to do with it, I have even baked a wedding cake.
- Photography, mostly nature and architecture photography though I am trying to get better at photos of people.
- Traveling, pre-pandemic I was trying to travel outside the country once a year, I love exploring new places and trying new things.