

## James Clark

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## Education

August 2015 - Present

**American University, Washington, D.C.** - *B.S. Computer Science, Minor: Mathematics*

Overall GPA 3.77, Major GPA, 3.91

January 2014 - May 2015

**Massasoit Community College, Brockton, MA** - *A.S. Computer Science Transfer*

GPA 3.9

## Skills

Python, Clojure, C, Java, Matlab, Linux, Git source control tools, Machine Learning, Tensor Flow, Windows, Mathematics, Scientific Computing, SQL, R

## Projects

**Quantum Glauber Ising Model** - Currently I am working alongside Dr. Andrew Koller from University Colorado Boulder where he is researching quantum many-body particles at Michigan State University. Together we are studying the effects on temperatures on the spins of atomic particles from a quantum perspective. Andrew does the physics where I am the computer scientist and my job is to create, program, and execute the simulation and model of quantum particles. As of now the abstract of our work titled "Nonequilibrium properties of the driven-dissipative Ising model" has been submitted to the damop conference.

**Chord Recognition** - As a senior year capstone project, me and my partner Erica Jurado developed, a machine learning application to recognize chords as music was being played. The neural network and signal processing is all done in Python. There is also a front end design which uses a javascript server to run the program on the web. You can visit [www.jamespclark.com](http://www.jamespclark.com) to try our application called Chordgi, just input a wav file and have it analyze the music to tell you what chords are in the song.

**A Fine-Grained Threshold-Setting Approach for Anomaly Detection in Data Streams** - Used one class learning algorithms in a machine learning setting to detect anomalies in streaming data. Program

was written in Python and R which used change point detection as an informed adaptation approach to variable sizes sliding windows. I was first author and second author was Dr. Nathalie Japkowicz, paper was submitted to FLAIRS conference on 11.20.2017 for publication.

**Optimizing Logical Model** - I am currently working with Dr. Julia Chifman of American Universities Mathematics Department for her research in biological modeling. Her paper titled “Activated Oncogenic Pathway Modifies Iron Network in Breast Epithelial Cells: A Dynamic Modeling Perspective” explores the effects of iron levels have on breast cancer cells. I am currently re writing her programs that were done in Mathematica, Perl, and Cython into a single programming language. After I will be working on optimizing techniques that come from a variety of areas and notably machine learning by using a Restricted Boltzmann Machine Neural Network.

**Hierarchical Growing Autoencoder** - I am currently working with Dr. Nathalie Japkowicz on another research project that is funded by Darpa to create a lifelong anomaly detection unit. The project will involve machine learning technology and statistical learning theory to create an adaptive system that evolves with time. The anomaly detection combines robustness and flexibility of an artificial neural network and its novel architecture with sensitivity of Bayesian change point analysis. The system will adapt by growing new autoencoders and organizing them into a a gating ensemble. It will then use change point techniques to recognize anomalies and concept drifts.

**Classical Glauber Ising Model** - I worked with Dr. Anzi Hu of American University Physics department on her research in quantum modeling of phase transitions. I created a simulation of magnetic states of atoms and modeled how they go through a phase transition during an increase/decrease in temperature. Program was written in C and run on a linux based cluster, after I used MATLAB for analysis on the data.

## Experience

January 2018 - Present

**American University Computer Science Department.** - *Teaching Assistant*

- I am a teaching assistant for Nathalie Japkowicz CSC-565 Operating Systems class where I assist students on questions, homeworks, and hold regular office hours. I also am a substitute teacher for when Dr. Japkowicz is out of town.

January 2018 - Present

**American University Computer Science Department.** - *Teaching Assistant*

- I am a teaching assistant for Dr. Adam Knapps CSC-521 Design and Organization of a Programming Language course. I assist students in on questions, homeworks, hold regular office hours, and hold review sessions for exams.

May 2017 - November 2017

**American University Computer Science Department.** - *Research Assistant*

- I am currently working under the supervision of Dr. Nathalie Japkowicz in her data science laboratory at American University.
- The focus of my research is to use change point detection methods to improve threshold determination of autoencoders. With this we can account for concept drift and outliers.

August 2016 - December 2 017

**American University Mathematics Department, Washington D.C. – *Calculus II and Calculus I Grader***

- Responsibilities Include: Grading homeworks and quizzes for both Calculus I and II for Professor Olga Cordero- Brana
- Skills required are to have gotten at least an A- or above in both classes and to have a recommendation from a professor. Also must have knowledge of differential and integral calculus as well as knowledge on infinite sequences and series.

May 2016 - August 2016

**Mac Landscaping, Plymouth, MA – *Laborer***

- Worked for a small local landscaping company doing miscellaneous tasks such as cutting grass, edging, weeding ect.
- Left to go back to school

January 2015 - August 2015

**Enomass, Stoughton, MA – *Delivery Driver***

- Made deliveries for a small wine distributor in and around Metro Boston Area
- Left due to pursuing school in Washington DC

November 2012 - May 2014

**Teltron Engineering Inc, Foxboro Ma – *CNC Machinist***

- Worked for a small metal fabrication company in Foxboro Mass primarily working on a CNC punch press machine. I would run and maintain the machine which was an Amada Pega 357 Turret Punch Press. I also would make changes to the computer code if needed to save time, tools, or material.
- Also would do other duties around the machine shop such as sanding, bending, or helping packing in the warehouse.
- I decided to leave to pursue school full-time

## Awards

Massasoit Community College-

Member of Phi Theta Kappa, Honors Society of Community Colleges,  
Dean's List Fall 2014 and Spring 2015

American University -

Member of Tau Sigma, Honors Society for Transfer Students that receive a GPA above 3.5 after transferring.

Member of Upsilon Pi Epsilon, Honors Society for Computer Science students,  
Dean's List Spring 2016, Spring 2017, Fall 2017