Melvyn Ian Drag

Curriculum Vitae

Highlights

- Skilled Python and C++ programmer.
- Expertise in convex optimization.
- Accomplished natural language processing engineer.
- Advanced Linux user.
- Open source contributor

Sample Programming Projects

NLTK I have contributed many bug fixes to this popular Python natural language processing package.

Multigrid Solver I solved programming exercises and reproduced figures from the book *A Multigrid Tutorial*. The book is about advanced techniques for solving partial differential equations.

CRF A machine learning classifier which produces very good predictions when given suitably preprocessed data. Written in C++, Python, and R, and makes calls to linear algebra libraries written in Fortran. Written while at Avlino Inc..

Heat Solver PDE solver with many visualization options. Solves the heat equation in 1 and 2 dimensions. I presented this code as a tutorial at the PyOhio conference in 2014, and the video can be seen online. I still regularly get emails from people all over the US, Europe and South America using my code for their research or teaching

Priority Queue Hospital I hadn't had a reason to use a priority queue in a while, so I wrote a program in C++ and SDL which uses this data structure. There is a graphical presentation of a hospital waiting room with patients with a variety of illnesses. The patients continuously arrive and a priority queue structure has a 'doctor attend to the patient with the most pressing need'. Patients live and die at the mercy of the heap.

8 Color Network Network analysis tool for studying the evolution of unstructured networks with local interactions. Default edge function is a smoothing operator that drives the colors of all nodes to one one color.

Epithelium Master's Thesis. Simulator of the development of epithelial tissue. Code solves a complicated system of differential equations to evolve the appearance of a tissue and drive the cells to an equilibrium configuration. Uses a number of libraries and programs to make simple animations.

Python Chess Implemented advanced moves such as pawn promotion in an unfinished game found on github.

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Assault Cube - MyMod — Modified version of a popular first person shooter. Added maps, changed physics, modified graphics, etc.

Relevant Work Experience

October 2015 - Present — **Lead Data Scientist**, Avlino, Inc., Holmdel, NJ.
Lead developer of machine learning software.Supervised and unsupervised learning, sentiment analysis, and deep learning. Code in Python, R, and C++ and use Hadoop, Spark, MapReduce, and other tools. My software is currently in use at a major telecommunications company, and software we have written is used by many large retail chains for market analysis.

August 2015 — **Instructor**, The Ohio State University, Columbus.
Taught two summer classes: *Essentials of Numerical Methods* and *Introduction to Python Programming*.

Jan 2015 - September 2015 — **Modeler/Engineer**, Battelle Memorial Institute, Columbus.
Development of powerful terrorism risk analysis tool in C++, Python and MPI for the Department of Homeland Security. Used govenment data to make recommendations to security officials about where and how to tighten border security. Co-Developer of Excel-based risk tool with rich functionality provided through VBA macros. Simple system administration tasks. Regular user of Oracle / Postgres / Access DBs. Can provide a strong reference from accomplished statistician supervisor with whom I worked closely on several projects.

May 2014- September 2015 — **GRE Instructor, Marketing Agent**, The Princeton Review, Columbus.
Highly rated instructor. Presenter at marketing events.

Fall 2014 — **Calculus Recitation Instructor**, The Ohio State University, Columbus.
Highly rated instructor.

Fall 2008 - Spring 2013 — **Mathematics Tutor**, New Jersey City University, Hudson County Community College, Jersey City.
Tutored all levels of undergraduate mathematics

Fall 2008 - Spring 2013 — **Private Mathematics Tutor**, New Jersey.
Tutored high school and college students on a one on one basis.

Education

Continuing — **Coursera and Udacity**, *Online*, Taken courses in English, Spanish, and Portuguese in Fourier Analysis, CSS, HTML5, Javascript, Machine Learning, Reinforcement Learning, Big Data, Deep Learning, Parallel Computing, Hadoop, Robotics..

Summer 2015 — **Workshop and Tutorial on PETSc**, *Argonne National Lab*, Learn to use the PETSc library for solving partial differential equations.

2013–2015 — **Master of Mathematical Science: Computational Science.**, *The Ohio State University*, Analytical and numerical methods for PDEs, parallel computing, advanced algorithms. Master's thesis: Epithelial tissue simulation. Investigation of pros and cons of various implementations of a model. Exploration of parallelization strategies.

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2008-2012 **BA Mathematics**, *New Jersey City University*, Undergraduate mathematics degree with classes in Abstract Algebra, Differential Equations, Number Theory, Vector Calculus, and other fundamental mathematical subjects, Several credits short of double major in Spanish.

Summer 2010 **Study Abroad**, *Universidad San Francisco de Quito, Ecuador*, Summer classes in chemistry and Spanish composition.

Academic Awards

2015 Rhodes Graduate Fellowship for Computational Scientists, OSU

Summer 2014 Travel grant from OSU to attend Scipy conference in Austin (scientific computing in Python conference)

2013-2014 Graduate Fellowship, OSU

2012 Grossnickle Scholarship, NJCU. For the senior with the highest GPA

2008-2012 Presidential Scholarship (Full Tuition), NJCU

2011 12th place out of approximately 100 at the Garden State Undergraduate Mathematics Contest

Computer skills

Expert C++, Python, R, CUDA, bash

Skilled CLISP, CAD, Scheme, HTML5, CSS3, Javascript, MongoDB, SQL

Other As we all do, I have experience with countless other languages as work and school have demanded. Please ask for more details.

Recent Presentations

2016 Avlino. "Implementing Log Linear Models."

2015 OSU and NJCU. "Implementing the Conjugate Gradient Method in Python: A Tutorial."

2015 Battelle. "Finite Difference Methods for Modeling Diffusion."

2015 Battelle. "Epithelial Tissue Simulation."

2014 PyOhio conference. "Solving the Heat Equation in Python".

2014 Columbus Code Camp. "Soft Error Vulnerability in Sparse Matrix Vector Products".

2014 OSU. "A Tour of Linear Algebra Libraries in C++ and Python".

2014 Python Monthly Meeting. "Cache efficient Python".

Languages

English **Mothertongue**

Spanish **Fluent**

Portuguese, Italian **Reading and Listening Proficiency.**

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Interests

- Foreign languages with interesting movies and radio programs and rich literatures.
- Dog training.

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