

Melvyn Ian Drag

Curriculum Vitae

Highlights

- Expert C++ (templates, OO, functors, etc.) and Python (proficient with whole Scipy stack) programmer.
- Advanced Linux user.
- Deep knowledge of data structures, algorithms, and floating point arithmetic.
- Interest in machine learning and optimization.
- Mathematically sophisticated.

Sample Programming Projects

- 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 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 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.
- 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, Programmer**, 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, YARN, and other tools. My software routes customer calls at a major telecommunications company based upon the customer's service in the past few weeks, and routes correctly 85% of the time. The company is being bought out and I would like to work closer to home after the sale.
- 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 government 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

- Pending **University of Delaware and Oak Ridge National Laboratory**, *University of Delaware*, GPU Hackathon to improve performance of CRF code..
- 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.

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

Interests

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