Melvyn Ian Drag

Curriculum Vitae

"The world was so new that many things lacked names, and to mention them one had to point with his finger." - GGM

Highlights

- Currently at DEKA R&D working on software for a cutting-edge medical device.
- Created `CalistoStudios.com`, a website where teachers can create math tests and have them automatically graded.
- Former chief data scientist specializing in big data and natural language processing.
- Former statistical programmer at Battelle, a major DOD government contractor.
- MMS in Computational Science from Ohio State. BA in Mathematics.
- Active in technical meetups, open source projects and programming contests.
- Love C++ and Python, but also regularly work with everything from Assembly to Scala to Responsive CSS.

Sample Programming Projects

Calisto Studios

`CalistoStudios.com` is a website where teachers can make and grade 30+ distinct multiple choice tests in under 5 minutes. The Calisto Studios project frees up huge amounts of teacher time, gathers and interprets educational data from all over the world, and facilitates the production of visually stunning examination materials with the click of a button.

Teachers select the types of questions they want on a test and generate a set of exams such that every student has a unique test.Teachers then download pdfs of exams and bubble sheets, administer the test, and upload smartphone pictures of bubble sheets to the site. The server then grades the exam, marks the answer sheet in green and red, and creates a solution manual that explains the steps that should be taken to solve all the problems on the test. I would love to provide more detail during an interview. I hope to continue to work on this site in my free time to improve it's look, feel, and functionality, to include support for open-ended questions, and to integrate with existing educational software.

I coded the full stack using Django, PostgresSQL, Docker, Ubuntu, Bash, OpenCV, Python, C++, LaTeX, Javascript, Responsive CSS, various graphical design softwares, d3.js and likely much more.

Doggy McDogFace

Django / Tensorflow project. Users upload a picture of dog and the computer guesses the breed. Can be found at `doggymcdogface.info`. I've been looking for a reason to use tensorflow recently and a dataset of dog images on `Kaggle.com` provided a great opportunity.

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Priority Queue Hospital — A C++ project I worked on while preparing for interviews. Uses as many language features and STL containers as possible, illustrates the purpose of several data structures, and uses SDL2 for animation.

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. Generates animations of the tissue morphogenesis.

Kaggle Contests — Participant in Kaggle data science contests.

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.

8 Color Network — Network analysis tool for with a gui for studying the evolution of unstructured networks with local interactions. Python and tkinter.

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

Relevant Work Experience

February 2017 - Present — **Software Engineer**, DEKA Research & Development, Manchester, NH.
Working on low level C++ and middleware for innovative medical devices. While I cannot talk about the specifics of the machines I work on, I can sketch what type of work I do. I was hired to rewrite a system-critical library written in C in a more easily digestible OO C++ style. This task required my full 40 hours a week for about six months as I had to not only redesign a library but also modify every call to its functions in the whole code base. I also had to produce documentation, unittests, integration tests, and verify that timing requirements were satisfied. Another aspect of the project was to change the text encoding from UTF16 to UTF8 and to put safeguards throughout the codebase that verified proper encoding of important text data. Since then I have worked on handling encryption of bluetooth communications between various Android and Linux devices, and also researched and implemented some encryption algorithms to run on resource constrained hardware.

October 2015 - February 2017 — **Lead Data Scientist**, Avlino, Inc., Holmdel, NJ.
Principal developer of machine learning software at a growing startup. Specialized in summarization and classification of terabytes of social media data. Led a team of junior employees, encouranging good software practices like automated testing, clean code writing, and use of version control with verbose commit messages. Coded in Python, R, Scala and C++ and used Hadoop, Spark, MapReduce, and other tools as needed. Our software caused a strike at a major telecommunications company because it automated too many jobs.

August 2015 — **Instructor**, The Ohio State University, Columbus.
Taught two summer classes: *Essentials of Numerical Methods* and *Introduction to Python Programming*. Materials I developed for the course can be found on my github page.

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. 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. 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*, Fourier Analysis, CSS, HTML5, Javascript, Machine Learning, Hadoop, Statistical Mechanics, Networking, Scala, etc..

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

I use Whatever tool is suitable for the job. I really like C++, Python, git, Linux and Vim, though.

Recent Presentations

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2016 Avlino. "Implementing Log Linear Models."

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

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.

Interests

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

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