# William Martino

*Curriculum Vitae*

+1 (203) 887-6964
wjmartino@gmail.com
Brooklyn, NY USA


## Profile

I revel in being thrown a sufficiently difficult problem or large dataset and having to find the solution without being told the question. Working with a good team is key. Intelligent, driven, genuine, and curious people are a must - these are personal traits that I like to see in others and which I do my best to exhibit myself. When left to my own devices, I will seek out that which I do not yet understand and the people who understand them.

I am always interested in discussing hard problems. Feel free to reach out if you have one and think I may be interested.

## Education

2006 - 2010 **Mathematics & Economics**, *Yale College*, New Haven, CT

*Research* Experimental Mathematics: applications of Fractal Geometry to Times Series data

1/2015 – 3/2015 *Hacker School*, New York, NY

*About* Hacker School is the programmer's equivalent to a Writer's retreat. The experience consists of 3 months of self directed work on whatever one is passionate about. My time was dedicated gaining a better mastery of Haskell specifically and core engineering generally – something I realized that I could not attain whilst working full time at the SEC. Thus, I chose to take a sabbatical from the SEC to pursue these interests full time.

*Topics* Wavelet & Fractal Based 1-Dimensional Clustering Algorithm (Python + Cython)
Finding a bug in go's GetEnv function and comparing it to the behavior of C, Node, Haskell, & Python
Bitly clone using Scotty & STM-Containers (Haskell) and React (JS)
Creating a database optimized for dense, write once, Time Series data domains (Haskell)

*Languages* Haskell, Python, JS, go, C, Scala, PureScript

*Libraries* Haskell: Parsec, Attoparsec, Vector, Lens, Scotty, STM, STM-Containers
JS: D3, DC, React

## Experience

2/2013 – Present **Senior Science Advisor**, *Securities and Exchange Commission*, New York, NY (on sabbatical)
Founding member and "Head of Tech" of the Quantitative Analytics Unit (QAU) in the SEC's National Exam Program. The QAU is dedicated to both analyzing the computer driven strategies of top financial institutions as well as to the development of software designed to aid the Commission's ability to understand & regulate. My responsibilities ranged from designing our servers & computer lab to analyzing High Frequency Trading data to being the Lead Engineer of the National Exam Analytics Tool (NEAT). NEAT was the first in-house development effort undertaken at the SEC and represented a paradigm shift in how the SEC regulates registrants specifically and how Techonology Projects are executed at the SEC generally. Created using FOSS technologies, NEAT has been such a wild success that is currently deployed nationwide to the SEC's nearly 2000 Examinations & Enforcement staff members as well as being incorporated into the core of the National Examination Program.

*Technologies Used* Python (pandas, numpy, flask, …), VBA, SQL, qSQL, sh, Q, K4, C, C++, HTML/CSS, Javascript (React), SQLite, PostgreSQL, Excel, Linux, Windows

4/2007 – Present **Co-Author/Researcher** with Prof. Michael Frame, *Yale University*, New Haven, CT & Remote
Created a new fractal geometry based approach for analysis of time series data. Developed algorithms and tools to apply and test the approach. These programs and tools have application in a variety of academic and industrial settings and over diverse data sets such as financial data and fetal heart rhythms. Resulting publications can be found below.
This research is still ongoing and likely always will be in my free time, just in a more diminished fashion. Recent work has revolved around a Wavelet based approach, which has been showing better results, implemented in python. Please refer to the github.com/buckie/wtmm-python for further details.

*Technologies Used* Mathematica, Python (Pandas, Numpy, Cython, Scipy)

10/2012 – 2/2013

**Software Engineer**, *AxialMarket*, New York, NY
Worked on building out the Data Analytics and Science backend. Reoriented the paradigms used for data collection and consumption. Retooled Axial's (then) current front end to analytics solution. Worked mostly in Python and Shell on AWS. My experience there was fantastic and it taught me a huge amount about both development and UNIX.

*Technologies Used* Python, grep/sed/awk, sh, Linux, MySQL, Django, Redis

1/2012 – 9/2012 **Quantitative Researcher (Consultant)**, *Barca Capital*, Remote
Engaged to develop fractal geometry approach to evaluating bond information in emerging markets to determine yield appropriate long tailed distributions for use in Monte Carlo simulations.

*Technologies Used* Mathematica, Python

3/2011 – 7/2012 **Support Analyst**, *ION Trading*, New York, NY
Senior leader on the dealer to dealer fixed income support desk. Facilitated maintenance and enhancement of trading tools that aggregate market data, create synthetic tradable spread instruments, and monitor key performance metrics including P&L, position and risk. Advised major financial institutions on optimization of software systems, the mitigation of latency and general strategy.

6/2005 – 9/2005 **Co-Author/Researcher** with Prof. Juan de la Mora, *Yale University*, New Haven, CT
Personally uncovered that the results of two years worth of worldwide measurements of Ionic :iquids were skewed by contamination and that a widely accepted, scientific measurement method was incorrect. Redesign of the methodology yielded not only the desired information but also was the subject of a paper that was published in a leading chemistry journal.

## Publications

2015 **Multifractal Measures of Time Series: Curvature Surfaces of f($\alpha$) Curves**
*W. Martino and M. Frame*, Mandelbrots Memorial Journal (Soon to be published) Designed a new method for deriving the curvature of the surfaces generated by the algorithm. Showed the connection between the systems memory and output of the algorithm.

2011 **Fractal and Multifractal Geometry: Scaling Symmetry and Statistics**
*W. Martino and M. Frame*, Wiley Interdisciplinary Review: Computational Statistics, December 2011. General overview of Fractal Geometry – the paper was requested by the publisher.

2010 **Multifractal Measures of Time Series: f(a) Surfaces**
*W. Martino and M Frame*, The International Journal of Bifurcation and Chaos 20.8 (2010) pp. 2453-2470. Research developed better understanding of the underlying local fractional dimensionality and value related to volatility of data sets as well as a means towards understanding a given system's intrinsic memory.

2006 **Surface Tension Measurements of Highly Conducting Ionic Liquids**
*W. Martino, J. Fernandez de la Mora, Y. Yoshida, G. Saito and J. Wilkes*, Green Chemistry. Winter 2006, p. 390- 411 Completely revamped the methods used to measure surface properties of Ionic Liquids. Work invalidated much of the previous published work on this topic and widely accepted scientific methodology.

## Technologies

Python ★★★★★
By far my most comfortable language. I have significant experience with the majority of its major libraries for the domains of application development (e.g. django, flask), data science (e.g. pandas, scikit-learn) and numerical/performance critical applications (e.g. numpy, pytables, cython). I have also mentored several people of varying skill levels in python.

VBA ★★★★★
I am, somewhat unfortunately, a master of this language. At the SEC the only language we were able to use for a prolonged period was VBA. As such, I designed an alternative approach to programming in VBA which discarded much of its agreed upon best practices and leveraged functional principals to ensure long term maintainability and application performance for a VBA code base of over 30k lines. The approach is best described as an intermediate representation of a Haskell program.

SQL

★★★★★
I adore SQL and am a big believer in the utility of putting together a well deigned relational database.

Linux Powertools ★★★★☆
This encompasses the command line in general as well as correctly & reproducibly configuring an environment.

HTML/CSS ★★★☆☆
I'm comfortable working in HTML/CSS and know enough to put together an acceptable website as well as to to debug a good one.

Q/K ★★★☆☆
I am comfortable with both languages and enjoy them on a personal level though I would not recommend their use in a production environment.

Mathematica ★★★☆☆
Though I have several years experience in Mathematica I have not used in year a few years. Python has replaced it as my data analytics tool of choice.

Haskell ★★☆☆☆
My current language of interest. Though I've studied it for several years, only in the past several months have I begun to feel comfortable with it. However, the study of Haskell has had a profound and positive impact on both how I think about engineering and how I implement solutions.

JS ★★☆☆☆
Though not a fan of the language, I do respect its power and prevalence. I can debug/fix things in JS as needed. My current interest in JS lays in the D3 and React libraries.

## Interests ∪ Hobbies

Technical Arduino Development & Hardware Hacking, Statistical Learning, Automation of Regular Activities, Keyboards, UNIX (generally), and Web Development (generally)

Travel India, Nepal, Australia, New Zealand, France, Italy, England, Dubai UAE

Personal Snowboarding, SCUBA, Surfing, Lacrosse (Goalie)

• buckie • Will Martino