

CARSON JAMES

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EDUCATION

MSc Mathematics
Oklahoma State University

August 2016 - May 2018
GPA: 4.0

BA Mathematics
Oklahoma State University

August 2013 - May 2016
GPA: 3.929

RESEARCH INTERESTS AND CURRENT PROJECTS

Time Series of Economic and Financial Data:

- I made a stock screener in python that pulls price data from the iex api and creates a graph with nodes and edges between nodes corresponding to tickers and conintegrated tickers respectively. I'm currently in the process of moving this to R and adding some GARCH modeling functionality. ([screener](#))
- I recently began making some notes on modeling financial data and risk. I am working through various sources like the 2000 and 2002 papers of Rockafellar and Uryasev detailing conditional value at risk and its equivalent forms, the 2008 paper by Chen detailing nonparametric estimation of conditional value at risk and the 2003 paper by Angelidis, Benos and Degiannakis detailing the estimation of value at risk using GARCH models. ([notes](#))

Stochastic Processes:

- I am currently in picking up stochastic integration with semimartingales and compiling some notes with exercises that might be useful for other students who are new to the area like me and would benefit from a pointed introduction. I was previously consulting various sources but recently I discovered the book *Limit Theorems for Stochastic Processes* by Jacod, Shiryaev and am now rewriting my notes. ([notes](#))

Arithmetic Dynamics:

- A requirement of my masters degree consisted in creating some introductory notes to some open problems in the area of arithmetic dynamics. The focus is centered on introducing the notion of height of algebraic numbers, potential theory and the interplay between the two. In particular, given some polynomial $\phi \in \mathbb{Z}[z]$ with $\deg(\phi) \geq 2$, we can consider the Julia set \mathcal{J}_ϕ of ϕ , the canonical height \hat{h}_ϕ associated with ϕ and the equilibrium measure μ of \mathcal{J}_ϕ , that is, the measure that minimizes the energy functional $\int_{\mathcal{J}_\phi^2} -\log|x-y|d\nu^2$ over all Borel probability measures ν with support in \mathcal{J}_ϕ . Then any sequence $(z_n)_{n \in \mathbb{N}} \subset \overline{\mathbb{Q}}$ with $\deg(z_n) \rightarrow \infty$ and $\hat{h}_\phi(z_n) \rightarrow 0$ as $n \rightarrow \infty$ has the conjugates of z_n equidistributing around \mathcal{J}_ϕ . There are open problems regarding the existence of a lower bound for $\hat{h}_\phi(z)$ for z not preperiodic and in some sense bounded, but there is no answer for even simple cases like $\phi(z) = z^2 + c$ with $c \in \mathbb{Z}$. I periodically update the notes. ([creative component](#))

WORK EXPERIENCE

Math Teacher at Pensacola High School
Courses Taught:

August 2019 - Present

- Honors Algebra II
- Honors Precalculus
- IB Statistics

Graduate Teaching Assistant at Oklahoma State University
Courses Taught:

August 2016 - May 2018

- Trigonometry (instructor of record)
- Business Calculus (recitation)

VOLUNTEER EXPERIENCE

Volunteer with Love Without Boundaries Cambodia
Responsibilities:

May 2018 - September 2018

- Taught English to grades 11 and 12 in Tuol Prasat High School,
- Assisted the LWB staff in writing donor reports.

SKILLS

Computer Languages

- Python (intermediate)
- C (intermediate)
- R (basic)
- SQL (basic)

Languages

- English (native)
- Spanish (fluent)

AWARDS AND HONORS

Hazel Bucy Endowment Fund (2017)

Member of Phi Beta Kappa Honor Society (2016)

Litchenburg Family Scholarship for Mathematics (2014)

Department of Mathematics General Scholarship (2014)

REFERENCES

Paul Fili, Department of Mathematics, Oklahoma State University, paul.fili@okstate.edu

Alan Noell, Department of Mathematics, Oklahoma State University, noell@math.okstate.edu

Igor Pritsker, Department of Mathematics, Oklahoma State University, igor@math.okstate.edu