CARSON JAMES

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EDUCATION

Phd Statistics — *August 2020 - May 2025*
Texas A&M University — GPA: 4.0

MSc Mathematics — *August 2016 - May 2018*
Oklahoma State University — GPA: 4.0

BA Mathematics — *August 2013 - May 2016*
Oklahoma State University — GPA: 3.929

RELEVANT COURSES AND MATERIAL COVERED

- **Current Courses:** probability (measure theory, martingales), R-programming, linear models
- **Past Courses:** real analysis (measure theory, basic functional analysis), complex analysis, algebra (groups, rings, fields, modules, vector spaces), arithmetic dynamics, mathematical cryptography, mathematical statistics, stochastic processes (discrete Markov processes, Poisson processes)

RESEARCH INTERESTS AND CURRENT PROJECTS

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 $\mathcal{J}_\phi$ of ϕ, the canonical height $\hat{h}_\phi$ associated with ϕ and the equilibrium measure μ of $\mathcal{J}_\phi$, 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 $\mathcal{J}_\phi$. Then any sequence $(z_n)_{n\in\mathbb{N}} \subset \overline{\mathbb{Q}}$ with $deg(z_n) \to \infty$ and $\hat{h}_\phi(z_n) \to 0$ as $n \to \infty$ has the conjugates of z_n equidistributing around $\mathcal{J}_\phi$. 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)

Stochastic Processes:

- I am currently working through *Stochastic Differenetial Equations* by Oksendal to pick up Stochastic Calculus. I am also compiling some notes and working on a program to find optimal policies for Markov decision Processes as a way to learn the material: (Markov Decision Process Notes)

C programming:

- As a way to learn the C language, I wrote some code to implement a basic number field structure that lets you add, multiply and find multiplicative inverses for field elements: (Number Fields Code)

Quantum Computing:

- To become familiar with the basics of Quantum Mechanics and Quantum Computing, I am working through *Introduction to Quantum Mechanics* by Griffiths, *Quantum Mechanics* by Merzbacher and Quantum Computation and Quantum Information by Nielsen and Chuang

WORK EXPERIENCE

Graduate Teaching Assistant at Texas A&M University *August 2020 - Present*
20hrs

Math Teacher at Pensacola High School *August 2019 - May 2020*
40+hrs

Courses Taught:

- Honors Algebra II
- Honors Precalculus
- IB Statistics

Graduate Teaching Assistant at Oklahoma State University *August 2016 - May 2018*
20hrs

Courses Taught:

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

VOLUNTEER EXPERIENCE

Volunteer with Love Without Boundaries Cambodia *May 2018 - September 2018*
40+hrs

Responsibilities:

- 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)
- Portuguese (basic)

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