Alex Albors Juez

Curriculum Vitae

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Citizenship: Spain

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Education

University of Washington September 2021 – March 2025
B.S. in Mathematics, Minor in Applied Mathematics (3.98/4) *Seattle, USA*

La Salle Bonanova High School September 2019 – June 2021
IB Diploma, Spanish Baccalaureate Diploma (42/45) *Barcelona, Spain*

Research Experience

Washington Experimental Math Lab Researcher January, 2025 – Present
Mentors: Alexander W. Hsu, Professor Bamdad Hosseini *Seattle, USA*

- Studying kernel collocation methods for solving partial differential equations.
- Employing low-rank Nyström approximations to accelerate inference.

Washington Experimental Math Lab Researcher September, 2024 – January, 2025
Advisor: Professor Stefan Steinerberger *Seattle, USA*

- Studied a greedy, randomized dynamical system in continuous state spaces.
- Derived asymptotic behavior of the Markov process in higher dimensions.
- Pre-print: arxiv.org/abs/2412.04284

Warwick Research Intern June, 2024 – September, 2024
Advisor: Professor Matthew Thorpe *Coventry, England*

- Studied Graph-based Semi-Supervised learning methods for Reinforcement Learning (poster).
- I designed an active learning framework for agents in the scarce reward setting, deriving theoretical guarantees using random graphs and the random walk behavior coming from the probabilistic interpretation of Laplace learning.
- I gave talks introducing the main methods in the literature and my results at the Warwick Statistics Summer Symposium and the 2024 Northwest Undergraduate Mathematics Symposium.

Washington Experimental Math Lab Researcher March, 2024 – August, 2024
Advisor: Professor Stefan Steinerberger *Seattle, USA*

- Studied a functional analysis problem dealing with optimization on matrix spaces.
- Computed explicit matrix extremizers in low dimensions, resolved an important subproblem involving partitions of the hypercube, and introduced L^p relaxations to study its asymptotics.
- Paper was accepted in Journal *Involve* (Pre-print: arxiv.org/abs/2408.00933).

Applied Mathematics Research Assistant June, 2023 – January, 2024
Advisor: Professor Bamdad Hosseini *Seattle, USA*

- Studied and implemented function space Markov Chain Monte Carlo algorithms for Bayesian inverse problems, focusing on the RCAR and pCN algorithms.
- I tested the algorithms on image denoising and reconstruction with sparse wavelet and fourier coefficients, and distributions non-gaussian priors in Hilbert spaces.

Other Experience

Teaching Assistant for Advanced Multivariable Calculus September 2024 – March, 2025

University of Washington *Seattle, USA*

- Course assistant for Multivariable Calculus (Math 224).
- Hold office hours, grade exams and monitor discussion boards.

Teacher Assistant for Fundamentals of Computer Science November 2022 – January 2023

Bellevue College *Bellevue, USA*

- Course Assistant for a fundamentals of data structures and algorithms class with 35 students.
- Responsibilities included monitoring discussion boards and holding exam reviews.

Washington Mathematics Directed Reading Program Fall 2022, Fall 2023

Department of Mathematics, University of Washington *Seattle, USA*

- Reading on high dimensional random walks: Applications to counting matroid bases (slides).
- Reading on the Mathematics of Sustainability: Fourier Analysis of Ice Cycles (slides).

Husky Math Club Research Officer September 2023 – June 2024

University of Washington *Seattle, USA*

- Organized weekly math talks from undergraduate and graduate students.
- Organized social events including Mathematics Jeopardy and UW's first Integration bee.

Awards & Honors

Outstanding Student Award

Honors Accelerated Calculus (Proof-based) *2022*

Dean's list

GPA: 3.98 *2021-2024*

High School Valedictorian

La Salle Bonanova, Barcelona, Spain *2021*

Specialized Skills

Programming Languages: Python, Matlab, Java, and Mathematica.

Selected Course Projects: Log-Concave Polynomials for MCMC on Matroids (slides), Optimal Transport with Proximal Splitting (slides, report), Transformer-based GANs (report), and Analytical and Stochastic SEIR Modelling (report).

Relevant Graduate Coursework: Measure Theory, Statistical Learning, Randomized Algorithms, Advanced Probability, Gradient Flows, and Functional, Complex and Harmonic Analysis.

Conferences Attended: Machine Learning in Infinite Dimensions Workshop (August 5th-9th, 2024), Northwest Undergraduate Mathematics Symposium (November 1st, 2024).

Other Interests

Languages: Spanish, Catalan (Native) English (Proficient), French, Portuguese (Intermediate).

Hobbies: Classical Piano, Chess, Skiing, Sailing and Spanish Cuisine.

Clubs: UW French Club, The Husky Math Club.