

# AGUSTIN GUERRA, PH.D.

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## PROFESSIONAL SUMMARY

Experienced transportation engineer with **5+** years of experience and **4+** years of research in traffic engineering and data analysis. Proven ability to apply **optimization, statistics, and machine learning** (predictive and classification models) to solve complex transportation challenges. Analytical, detail-oriented, and collaborative with a strong track record of independent work and a passion for continuous learning. Experience in developing control optimization algorithms aimed at enhancing the traffic performance considering Connected Automated Vehicles capabilities.

## EDUCATION

### PhD in Civil Engineering

University of Florida

Aug. 2019 – May 2023

Gainesville, FL

### MS in Civil Engineering

University of Kansas

Aug. 2017 – May 2019

Lawrence, KS

### BS in Civil Engineering

Universidad Tecnologica de Panama

Mar. 2008 – May 2013

Panama, PA

## TECHNICAL SKILLS

**Expertise:** Transportation Engineering, Statistical Analysis, Operation Research, Machine Learning

**Programming and Statistical Languages:** Python (+4 years), R (1 year), C++/SQL (< 1 year)

**Software:** MS Office, SPSS

**Developer Tools:** Github, Visual Studio Code

**Scientific Python Libraries:** Pandas, NumPy, Matplotlib, Pandas, Gurobi, CPLEX, sci-kit learn, TensorFlow, Selenium, Seaborn, SimPy, webdrivermanager, xml, SPaCy, Streamlit, kepler

## EXPERIENCE

### Research Scientist

INDICATIC AIP

Jul. 2023 – Present

Panama, PA

- Championed \$69,905 in funding within 3 months by successfully writing and submitting a proposal to enable internship programs for thesis students from Panama at the Illinois Institute of Technology
- Supported Supported research-grant proposal, securing \$70,000 in research funding (Co-PI)
- Led the establishment of a research agenda at the newly established National Institute of Advanced Scientific Research in Information and Communication Technologies (INDICATIC-AIP), aligning with the United Nations Sustainable Development Goals (SDG), with a focus on transportation

### Graduate Research Assistant

University of Florida

Aug. 2019 – Present

Gainesville, FL

- Lead two research projects sponsored by the NSF (\$1,296,428) and the STRIDE-H6 (\$329,692) from conceptualization to completion, each project with published articles and others under preparation
- Performed all phases of the research process, including problem definition, literature review, research design, data collection, analysis of results, and preparation of reports
- Developed optimization algorithms in Python for arterials considering Connected Automated Vehicles (CAVs) capabilities
- Developed, maintained, updated, and documented the development of simulation algorithms in Python for the evaluation of CAVs control strategies
- Performed unit, integration, story, and acceptance tests of numerical simulations for CAVs
- Assisted in the implementation of optimization algorithm for isolated intersections in a microsimulation software
- Formulated different optimization models to reduce intersection delays, including LP, IP, and MILP models
- Developed heuristic methods using search-based algorithms to reduce delays in arterials
- Developed a Python-based data pipeline to extract CAVs trajectories from connected vehicles
- Implemented various techniques for data preprocessing, including data normalization, outlier detection and removal, and feature selection, to ensure the quality and integrity of the data prior to analysis
- Evaluated machine learning algorithms to estimate the occurrence of future crashes
- Facilitated the coordination of projects' activities to meet deadlines

## Highway Engineer

Nov. 2012 – Aug. 2017

Louis Berger

Panama

- Championed the development of highway design projects. My project portfolio comprises several projects in the Latin American region (Panama, Colombia, Honduras, and Peru) adding up to \$3 billion in construction amount
- Coordinated with different departments (geotechnical, hydraulic, and pavement) to meet deadlines
- Facilitated the establishment of a new business unit in Bogota, Colombia
- Supervised and provided mentorship to a team of four drafters, contributing to their professional development, and ensuring project deliverables met quality standards

## LEADERSHIP/INVOLVEMENT

<b>Founding Member and Chair of the IEEE-ITSS Student Chapter:</b> Led the efforts to establish an IEEE Student Chapter branch of the Intelligent Transportation Systems Society (ITSS) at the University of Florida	2021 – 2022
<b>ITE University Chapter Vice President:</b> Coordinated student seminars and ITE activities	2021 – 2022
<b>Student Representative at the UFTI Internal Steering Committee:</b> Promoted engagement activities between industry professionals and students	2020 – 2022
<b>Media Manager at KU Fulbright Student Association:</b> Led dissemination of activities promoted by the Fulbright Student Board, 2018	2018 – 2019

## FELLOWSHIPS & AWARDS

<b>ITS Florida Anne Brewer Academic Scholarships:</b> Awarded by the ITS Florida Chapter	2022
<b>Second Place, IEEE-ITSS Logo Design Competition:</b> Awarded by the IEEE Intelligent Transportation Systems Society (ITSS)	2022
<b>Fulbright Fellowship:</b> Awarded by the U.S Bureau of Educational and Cultural Affairs	2017
<b>Petroterminal of Panama Scholarship:</b> Awarded by the Petroterminal of Panama (PTP) to complete a Bachelors's Degree at the Universidad Tecnologica de Panama	2009

## RELEVANT PROJECTS

<b>Evaluation of Apartment Pricing and Urban Development in Panama City</b>   Panama	2023
<ul style="list-style-type: none"><li>• Developed data scraper to collect the spatial distribution of residential projects, and transportation network in Panama City</li><li>• Performed data preprocessing, exploratory data analysis, outliers detection</li><li>• Evaluate Machine Learning prediction models, ANN, XGBoost, Random Forest, Linear Regression</li></ul>	
<b>Social Network Analysis, Research Topics in Transportation Engineering</b>   Florida	2022
<ul style="list-style-type: none"><li>• Developed data scraper to collect relationships among researchers</li><li>• Performed data preprocessing, exploratory data analysis, outliers detection, and treatment</li><li>• Performed network analysis to identify key stakeholders' degree, betweenness, and closeness centrality analysis</li></ul>	

## PUBLICATIONS

### Peer-Reviewed Journals

- [1] **Guerra, A.**, L. Elefeteriadou. Platooning Trajectory Optimization for Connected Automated Vehicles in Coordinated-Arterials. *Transportation Research Record*, 2022. <https://doi.org/10.1177/03611981221112099>
- [2] **Guerra, A.**, V. Gadhiya, P. Srisurin. Crash Prediction on Road Segments Using Machine Learning Methods. *ASEAN Engineering Journal*, 2022. <https://doi.org/10.11113/aej.v12.17601>

### Conference Proceedings

- [1] L. Carvalho, **Guerra, A.**, X. Wang, P. Manjunatha, L. Elefeteriadou. Simulation Platform for Testing and Evaluation of CAV Trajectory Optimization and Signal Control Algorithm Integrated with Commercial Traffic Simulator. *Proceedings of the 2022 Winter Simulation Conference*. <https://doi.org/10.1109/WSC57314.2022.10015399>
- [2] **Guerra, A.**, E. Amini, L. Elefeteriadou. A Computationally-Efficient Algorithm to Enable Joint Optimization of Connected Automated Vehicles' Trajectories and Signal Phasing and Timing in Coordinated Arterials, 2024. <https://dx.doi.org/10.2139/ssrn.4411134>
- [3] **Guerra, A.**, L. Salas-Nino. Actuated Micromobility Users Presence Awareness System in Urban Arterials. *The Transportation Research Board (TRB) 102st Annual Meeting*, 2023