

JUAN ACOSTA-SEQUEDA

🌐 juanacostasequeda.com ✉ jacost42@uic.edu 🌐 [jugacostase](https://github.com/jugacostase)

PROFILE

PhD candidate at the Complex and Sustainable Urban Networks Lab, a master's in engineering, and a bachelor's degree in physics. I conduct urban science and engineering research by leveraging my background in computational physics, GIS, and software development. I am particularly interested in understanding human interactions with artificial systems and the emerging phenomena that arise from them, focusing on understanding the interdependent nature of networks across different scales.

EDUCATION

PhD in Civil Engineering August 2021– May 2025
Department of Civil, Materials, and Environmental Engineering, College of Engineering
University of Illinois Chicago

Master in Engineering- Transportation July 2021
Civil and Agricultural Engineering Department, Faculty of Engineering
National University of Colombia

Bachelor in Physics May 2018
Physics Department, Faculty of Science
National University of Colombia

PUBLICATIONS

- Acosta-Sequeda, J.**, Mohammadi, M., Patipati, S. et al. Estimating Telecommuting Rates in the USA Using Twitter Sentiment Analysis. *Data Science for Transportation* 6, 28 (2024). <https://doi.org/10.1007/s42421-024-00114-0>
- Acosta-Sequeda**, Juan, Hevar Palani, Ali Movahedi, Aslihan Karatas, and Sybil Derrible. 2023. "Residential Electricity Consumption Patterns and Their Relationship to Commute Times by Mode." Findings, September. <https://doi.org/10.32866/001c.87940>.
- Acosta-Sequeda J**, Derrible S 2023 GTdownloader: A Python Package to Download, Visualize, and Export Georeferenced Tweets From the Twitter API. *Journal of Open Research Software*, 11: 7. DOI: <https://doi.org/10.5334/jors.443>
- Hevar Palani, **Juan Acosta-Sequeda**, Aslihan Karatas, Sybil Derrible, The role of socio-demographic and economic characteristics on energy-related occupant behavior, *Journal of Building Engineering*, Volume 75, 2023, 106875, ISSN 2352-7102, <https://doi.org/10.1016/j.jobe.2023.106875>.
- T.-T.-T. Ngo, H. T. Pham, **J. G. Acosta**, and S. Derrible, "Predicting bike-sharing demand using random forest," *Journal of Science and Transport Technology*, vol. 22, pp. 13-21, May 20

TECHNICAL SKILLS

Skills	Mathematical Modeling, Machine Learning, Language Modeling
Programming Languages	C++, C#, Python, JavaScript, SQL, Git, R
Frameworks and Libraries	Django, Pandas, GeoPandas, Plotly, SciPy, Keras, TensorFlow, LangChain
Software	ArcGIS, QGIS, Emme, Polaris. AequilibraE

WORK EXPERIENCE

Research Affiliate May 2023 – Present
Argonne National Laboratory, Lemont, IL, United States of America

- Tasks include network modeling, Machine Learning applications in the Polaris Modeling Framework, and source code maintenance and contribution.

Visiting Researcher

July 2024- August 2024

Okinawa Institute of Science and Technology, Okinawa, Japan

- Worked on developing a computer interface to assist proteomics research with automated analysis workflows employing Large Language Models and data analysis tools using natural language as input.

Research Assistant

August 2021 – Present

Complex and Sustainable Urban Networks Laboratory, University of Illinois Chicago

- Active participation in research projects that included project conception, data collection, data modeling, software development, and supporting roles in grant proposal submissions.

Teaching Assistant

August 2021 - May 2023

University of Illinois Chicago, Chicago, IL, United States of America

- Supporting office hours, grading, and exam proctoring for CME 405 – Foundation Analysis and Design, CME 403- Hydraulic Design, and CME 427– Engineering Hydrology.

Consultant

September 2019 – July 2021

Steer, Bogota, Colombia

- Roles included data analysis and transportation modeling in Emme. I took part in the model of Colombia's two biggest cities and one of Canada's biggest cities by scripting Python modules using the EMME API.

GIS web Developer

June 2018 – August 2019

Esri, Bogota, Colombia

- Developed geographical web applications using Esri technologies in JavaScript.

CONFERENCES

1. Acosta-Sequeda, J; Auld, J; Derrible, S. Emerging electricity usage patterns and their origins in urban travel behavior. Conference on Complex Systems 2024: CCS'24 Exeter London. Oral presentation.
2. Acosta-Sequeda, J. The Interrelated Nature of Urban Travel and Electricity Usage: The Case of Chicago Area. Transport Chicago Conference, Poster Presentation. June 2024.
3. Acosta-Sequeda, J. Early Evidence on the Effects of EV Adoption and Charging Infrastructure in Electricity Usage Patterns in the Chicago Area. Polaris User Group 2024 conference. Oral presentation.
4. Acosta-Sequeda, J; Mangones, S; Bulla-Cruz, L. Automatic Detection of Simultaneous Arrivals at Intersections as Elementary Events for Road Exposure Estimation. TRB Annual Meeting 2024. Poster presentation.
5. Acosta-Sequeda, J.; Mohammadi, M.; Patipati, S. et al. Improving Telecommuting Prevalence Estimates Using Sentiment Analysis of Twitter Data. TRB Annual Meeting 2024. Poster presentation
6. Acosta-Sequeda, J., Munoz-Castano JD. A cellular automaton model for the simulation of an articulated buses massive transportation system. Traffic and Granular Flow, Pamplona, Spain, 2019. Oral presentation.

RESEARCH PROJECTS

[Polaris Automatic Network Model Generation](#)

May 2023- February 2024

- Integrated a module into the [Polaris modeling framework](#) to automatically download, standardize, and simplify urban networks from Open Street Map data.
- Applied Machine learning-based validation to ensure network consistency across all links and nodes.

Impacts of EV adoption in Chicago

May 2024- Ongoing

- Integrated data from electricity utility providers, electric vehicle charging facilities, and demographics data.
- Estimated current and future behavioral patterns in the commercial use of charging facilities and currently studying the impacts on the electric grid.

Greater Chicago Agent-Based Model

August 2024- Ongoing

- Incorporated CMAP inputs into the existing agent-based model of the Greater Chicago Region to forecast activity-based scenarios for the year 2050.

The relationship between electricity usage and travel demand

May 2023- Ongoing

- Processed 4 years of data containing 30 minute-interval electricity consumption of 4 million electricity meters in Chicago.
- Developed a Time Series forecasting workflow to estimate rail and bus ridership predictions by measuring local changes in electricity usage

GTDDownloader: Geographical Tweet Downloading Tool

August 2022- March 2023

- Developed a [Python library](#) following good practices in software development, continuous integration, and release.
- The library uses the Twitter API to download, visualize, and export geo-tagged posts.

Socio-demographic characteristics and energy-related occupant behavior

December 2021- July 2023

- Investigated the relationship between occupants' socio-demographic profiles and their energy behavior.
- Applied machine learning methods on occupants' energy consumption behavior to identify highly predictive features.

Social media data for telecommuting estimates

August 2021- March 2023

- Fine-tuned a language model to estimate sentiment from thousands of tweets automatically.
- Showed that Twitter conversations can be used as a proxy of telecommuting decisions, which can be used to estimate telecommuting rates at the national, state, and city levels depending on conversational activity.

MEMBERSHIPS

- Active member of the [American Society of Civil Engineers](#)
- Friend of the Standing Committee on [Statewide/National Transportation Data and Information of the Management](#) of the Transport Research Board
- Friend of the Standing Committee on [Artificial Intelligence and Advanced Computing Applications](#) of the Transport Research Board
- Active member of the [Complex Systems Society](#).

WORKSHOPS AND OTHER ACTIVITIES

- Participant in the [workshop on Mathematical Foundations for Equity in Transportation Systems](#) at UCLA after being selected for the IPAM travel grant. January, 2024
- Completed the [Introduction to AI-driven Science on Supercomputers student training program](#) at the Argonne Leadership Computing Facility. November, 2022.

LANGUAGES

Spanish: Native

English: Fluent

German: Basic