

# VANESSA CEDENO-MIELES, PH.D.

Research Scientist - Applied Machine Learning, Simulation & Large-Scale Systems - [vcedeno.github.io](https://vcedeno.github.io)

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**Research Interests:** Research scientist and interdisciplinary leader with 10+ years of experience building scalable modeling, simulation, and AI-driven analytics to solve complex sustainability challenges.

## Education

Ph.D. in Computer Science - Virginia Tech, Blacksburg, VA	2014-2019
M.S. in Computer Science - Florida State University, Tallahassee, FL	2008-2010
B.S. in Computer Science - ESPOL, Guayaquil, Ecuador	2002-2007

## Research

### University of Virginia

*Postdoctoral Research Associate*

**Aug 2024 – Present**

*Charlottesville, VA*

- **Owned and initiated** a research agenda on large-scale agent-based and networked simulations to evaluate carbon reduction interventions in U.S. cement manufacturing.
- Designed and implemented a **Python-based experimentation framework** supporting large-scale simulation runs, iterative hypothesis testing, and metric-driven evaluation.
- Integrated **machine learning and large language models with empirical and qualitative data** to parameterize, validate, and stress-test simulation models.

### ESPOL

**Jun 2019 - July 2024**

*Assistant Professor*

*Guayaquil, Ecuador*

- Led applied research on **data-driven modeling and simulation of networked social systems**, combining empirical data analysis, simulation, and experimentation.
- Built **Python-based data pipelines** for longitudinal behavioral datasets from distributed systems (FamilySong), enabling scalable and reusable analysis for ICT/HCI research.
- Served as Associate Sub-Dean (2022-2024) overseeing large academic programs (2,000+ students, 120+ faculty), managing complex, and multi-stakeholder initiatives.

### Network Dynamic and Simulation Science Laboratory - Virginia Tech

**January 2015 – May 2019**

*Graduate Research Assistant*

*Blacksburg, VA*

- Independently **owned end-to-end research problems** from formulation through experimental design, large-scale simulation, evaluation, and publication.
- Developed **scalable, reusable Python research infrastructure** for simulation and data analysis of networked social experiments to explain human behavior.
- Developed **mechanistic and data-driven behavioral models** from large experimental datasets and integrated them into an agent-based simulation and experimentation platform.

## Selected Publications

- **Cedeno-Mieles, V.** et al. “A Framework for Modeling and Simulation of Multi-dimensional Coupled Socio-Environmental Networked Experiments.” Winter Simulation Conference (WSC) 2025.
- **Cedeno-Mieles, V.** et al. “Data analysis and modeling pipelines for controlled networked social science experiments.” PLOS ONE, 2020.
- **Cedeno-Mieles, V.** et al. “Mechanistic and Data-Driven Agent-Based Models to Explain Human Behavior in Web-Based Group Anagram Game”. ASONAM, 2019.

(Full list available at [vcedeno.github.io/papersbyyear.html](https://vcedeno.github.io/papersbyyear.html))

## Experience

### ESPOL

**May 2010 – Jul 2014**

*Assistant Professor*

*Guayaquil, Ecuador*

- Led a multi-phase accreditation initiative resulting in the **first ABET-accredited Computer Science program in Ecuador**, coordinating cross-functional teams, formal evaluation frameworks, documentation pipelines, and audits.

## Technical Skills

**ML & Modeling:** Agent-based and stochastic simulation, Statistical & ML models, Data-driven behavioral modeling, Generative & hybrid models, Deep learning, NLP.

**Systems & Data:** Large-scale simulation, Data pipelines, ETL, Model validation, HPC workflows, Database design.

**Programming:** Python, JavaScript, R, C++, Java, MATLAB, SQL