

# JASON PHILLIP LU

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## OBJECTIVE

Senior student in Industrial Engineering with research interest in optimization and machine learning to innovate transportation in intelligent freight, transit, and mobility systems.

## EDUCATION

### Georgia Institute of Technology

*Expected Dec. 2022*

- Bachelor of Science, Industrial Engineering
  - Concentration in Analytics and Data Science
  - GRE (*August 2021*): Quantitative – 169 | Verbal – 162 | Analytical Writing – 4.5
- GPA: 3.93/4.00**

## RESEARCH EXPERIENCE

### Undergraduate Research Assistant

Georgia Institute of Technology

Supervisor: Prof. Pascal Van Hentenryck

[Socially Aware Mobility Lab](#)

### *Metropolitan Atlanta Rapid Transit Authority (MARTA) Reach*

*Oct. 2022-Present*

- Conducted a six-month pilot of On-Demand Multimodal Transit Systems (ODMTS) on MARTA.
- Experimented varying shuttle fleet sizes, autonomous vehicles, and greater ridership scenarios using data from the pilot.
- Assessed wait/travel times, ridesharing, empty miles, and utilization from pilot experiments.

### *Network Design Optimization in ODMTS*

*May 2022-Present*

- Enhanced ODMTS transit network modeling by incorporating bus lines.
- Implemented code in Python to evaluate rider paths and objective costs through ODMTS on bus lines across bus transit routes.
- Created transit data on the current system and assessed rider paths on system ridership in terms of travel times and rider choices.

### *Dedicated Bus Lanes (DBLs) and Congestion in ODMTS*

*Feb. 2021-Present*

- Extended ODMTS model to include DBLs and congestion.
- Measured the extended ODMTS model impact on adoption, cost, and travel times through a case study on I-85 in the Metro Atlanta area.
- Conducted initial overview through Google Maps and GDOT on DBLs and congestion.
- Used Google Maps Platform, OpenStreetMaps, and Polaris to create various congestion scenarios in ODMTS with DBLs for the case study.
- Concluded that DBLs were effective in decreasing travel times and increasing adoption in ODMTS without negatively affecting system cost.

## WORKING PAPERS

**Jason Lu**, Anthony Trasatti, Hongzhao Guan, Kevin Dalmeijer, Pascal Van Hentenryck, “Impacts of Dedicated Bus Lanes and Congestion on On-Demand Multimodal Transit Systems”

## PROJECTS

### Senior Design Capstone Project: Convoy Shipment Process Improvement

*Spring 2022*

Faculty Advisor: Prof. Leon McGinnis

- Mitigated conflicting appointment time (CAT) errors from Convoy’s shipment processes.
- Analyzed communications and shipment data from Convoy to determine root causes of CATs.
- Created a machine learning model in Python and a standard operating procedure to prevent CATs in future shipments.
- Recommended improvements to load confirmation updates, additional data to collect, and changes to operators’ user interface (UI).

- Saved Convoy over \$1 million annually, 4.3 hours/shipment, and 190000 miles/year.
- Selected as 1 of 3 Senior Design Capstone Finalists out of 28 total senior design teams.

#### **Investigating Effects of Ramp Metering on Traffic Flow in Complex Traffic Systems** *Spring 2021*

- Designed a discrete-based simulation in Python to evaluate ramp metering through three different ramp metering strategies: no policy, ALINEA, and a modified ALINEA.
- Applied the simulation on a case study for I-75/I-285 interchange.
- Concluded that modified ALINEA was the best policy for increasing vehicle velocities on the interstate while avoiding an increasing ramp queue.

#### **Machine Learning for Wildfire Susceptibility Mapping** *Spring 2021*

- Collected and cleaned data to predict wildfire levels across the U.S. for the year 2020.
- Implemented unsupervised and supervised machine learning techniques in Python to reduce dimensions of the dataset, then trained models to predict wildfire levels.

#### **Minimum Vertex Cover (MVC) Problem** *Fall 2020*

- Designed four different algorithms (branch and bound, approximation, stochastic local search, simulated annealing local search) to solve the MVC problem.
- Tested algorithms coded in Python on datasets from the 10<sup>th</sup> DIMACS challenge and undertook empirical evaluation to assess the effectiveness of each algorithm.

### **INDUSTRY**

#### **Industrial Engineering Co-op, Yokogawa** *May 2021-Dec. 2021*

- Automated recording and display processes from over 100 engineering data files, eliminating errors in manual reporting and saving 300 hours annually.
- Created an algorithm to generate product numbers, eliminating manual reporting.
- Improved an existing UI to include additional features, digitalizing display and preventing errors.

#### **Industrial Engineering Co-op, Yokogawa** *May 2020-Jul. 2020*

- Created a UI in VB and SQL that transformed manufacturing line boards to a digital format with live display, moving the company to a paperless model.
- UI saved 1500 hours annually, eliminated fines for insufficient displays, and was selected for Yokogawa's Global Manufacturing Engineering Competition.

### **TEACHING**

#### **Head Teaching Assistant, [The Seth Bonder Camp](#)** *Summer 2022*

- Led two week-long camps for high school students.
- Organized logistics, guided interactive activities, and managed teaching assistants.
- Taught computer and data science principles through Snap!, a visual programming language.

#### **Undergraduate Teaching Assistant, Georgia Institute of Technology**

Simulation Analysis and Design – Instructor: Prof. Seong-Hee Kim

*Summer 2022*

Decision and Data Analytics – Instructor: Prof. Jye-Chyi Lu

*Spring 2022*

Statistics and Applications – Instructor: Dr. Tuba Ketenci

*Spring 2021*

- Advised three semester-project teams by guiding model formulations, monitoring progress, giving recommendations, and reviewing deliverables.
- Taught students R, Simio, ExpertFit, and Python Modules from SciPy.
- Held office hours and graded homework, labs, and midterm/final projects.

### **SKILLS**

**Programming:** Python, C/C++, SQL, R, LaTeX, Java, OPL, MATLAB, HTML/CSS

**Scientific Toolbox:** Numpy, Pandas, Matplotlib, SciPy, Networkx, Folium, Shapely

**Commercial Solvers:** Gurobi, CPLEX

**Software:** Jupyter Notebook, HTCondor, Visual Studio, Simio, Minitab, Microsoft Office

**Operating Systems:** Linux, Windows, MacOS