JASON PHILLIP LU

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OBJECTIVE

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

EDUCATION

Georgia Institute of Technology ***Dec. 2022***

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

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 10th 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