

# KLAAS FIETE KRUTEIN, PH.D.

## Operations Research and Applied Scientist

+1 (206) 465-8414    @ fietekrutein@gmail.com    3215 NW 65th St, 98117    Seattle, WA    klaas-fiete-krutein  
singfie    singfie.github.io

## EXPERIENCE

### Operations Research Scientist

#### Convoy, Inc.

Aug 2022 - Ongoing    Seattle, WA

- Led research on optimally matching carriers to time-based contracts to reach a market equilibrium.
- Led the design and implementation of novel routing algorithm to maximize utilization of time-based carrier contracts through optimal route allocation of inter regional shipments into production code.
- Identified areas of improvement in existing routing and job scheduling infrastructure and reduced loss by 20%.
- Led science part of strategic product planning and entitlement analysis for time-based contract driven shipment fulfillment.

### Research Associate

#### University of Washington – Supply Chain Transportation & Logistics

Jun 2019 – Jun 2022    Seattle, WA

- Led collaboration with Municipality of Bowen Island in Canada and coordinated team of 2 people to develop optimized evacuation plan.
- Slashed estimated evacuation time of isolated communities by 70% through mixed-integer stochastic optimization model, solved through meta-heuristics.
- Reduced route time for commercial trucks by 7% through combined OD-matrix estimation and route optimization framework that incorporates expected parking delays into vehicle routing.
- Developed demand-driven mixed integer model to optimize the location of commercial vehicle loading zones in urban areas.

### Research Scientist Intern

#### Amazon, Inc.

Jun - Sep 2020 & Jun - Sep 2021    Seattle, WA

- Improved expected resource planning cost for trucks by approx. 15% through routing-based resource optimization model using robust optimization and column-generation decomposition techniques in nationwide logistic network.
- Reduced manual adjustments in resource planning process by approx. 60% through flexible block-based resource planning tool.
- Saved \$26M in fixed costs per year in North American middle mile logistics network through combined planning and routing of multiple value streams with a shared equipment fleet.
- Reduced analysis time for equipment rightsizing and combined routing simulation from approx. 3 months to 12 hours of analysis time by leveraging big data warehousing, parallel computing and data pipeline integration.

### Research Associate

#### University of Washington – Dep. of Industrial Engineering

Sep 2018 - Jun 2019    Seattle, WA

- Designed experiment, simulator set up, data collection, and analysis for a pilot workload study in flight simulator.

## SUMMARY

Operations research scientist with 2 years of industry work experience and 4 years of academic research experience specializing in optimization modeling, routing problems, machine learning, and data science.

## MOST PROUD OF

**Research Output**  
that is directly applied and helps organizations and people

**Personal Growth**  
experienced through balancing technical skills with project leadership and interdisciplinary collaboration to maximize impact of OR tools at Convoy

## STRENGTHS

Research    Innovator    Team Worker

Leader    Problem Solver

Optimization    Machine Learning

Simulation    Experiments    Statistics

Data Visualization    Cloud Computing

Linear & Non-Linear Programming

## PROGRAMMING & TOOLS

Python    ●●●●●  
SQL    ●●●●●  
R    ●●●●●  
Java    ●●●●●  
TypeScript    ●●●●●  
Unix Bash    ●●●●●

Pandas    ●●●●●  
NumPy    ●●●●●  
Scikit-learn    ●●●●●  
Pyomo    ●●●●●  
Dplyr    ●●●●●  
Ggplot2    ●●●●●  
Shiny    ●●●●●  
AWS    ●●●●●  
Gurobi/CPLEX/Xpress    ●●●●●  
Git    ●●●●●

## LEADERSHIP SKILLS

- Developed a simulation model for investigating the effect of urban traffic density-based vehicle guidance systems on traffic flow.

## Material Planner Intern

### Tesla, Inc.

📅 Jun 2018 - Sep 2018 📍 Reno, NV

- Reduced number of missing parts in warehouse by 10% through statistical data analysis and machine learning model to identify causes of missing parts and predict inventory shortage.
- Streamlined cross-functional processes for improved material and information flow between three business units.

## Supply Chain Improvement Manager

### Airbus Operations GmbH

📅 Oct 2016 - Sep 2017 📍 Hamburg, Germany

- Reduced inventory capital tie-up by \$100M through data-driven target-setting process for optimized inventory levels.
- Collaborated with Business Transformation Director on 5 year road map for improved supply chain, and managed the resulting project portfolio.

## PUBLICATIONS

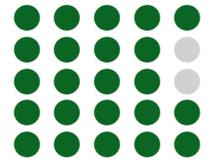
### 📄 Journal Articles

- Dalla Chiara, G., Krutein, K., Ranjbari, A., & Goodchild, A. (2022). Providing curb availability information to delivery drivers reduces cruising for parking. *Scientific Reports*, 12(19355). doi:<https://doi.org/10.1038/s41598-022-23987-z>
- Krutein, K., Dalla Chiara, G., Dimitrov, T., & Goodchild, A. (2022). Improving commercial vehicle routing through the consideration of cruising for parking. *Available at SSRN*. retrieved from <https://ssrn.com/abstract=4183322>
- Krutein, K., & Goodchild, A. (2022). The isolated community evacuation problem with mixed integer programming. *Transportation Research Part E: Logistics & Transportation Review*, 161(102710). doi:<https://doi.org/10.1016/j.tre.2022.102710>
- Krutein, K., Goodchild, A., & Boyle, L. (2022). Robust and rolling horizon optimization approaches for handling uncertainty in the isolated community evacuation problem during emergency response. *Under Review*.
- Krutein, K., McGowan, J., & Goodchild, A. (2022). Evacuating isolated islands with marine resources: A bowen island case study. *International Journal of Disaster Risk Reduction*, 72(102865). doi:<https://doi.org/10.1016/j.ijdr.2022.102865>
- Dalla Chiara, G., Krutein, K., Ranjbari, A., & Goodchild, A. (2021). Commercial vehicle driver behaviors and decision making: Lessons learned from urban ridealongs. *Transportation Research Record: Journal of the Transportation Research Board*, 2675, 608–619. doi:<https://doi.org/10.1177/036119812111003575>

### 👥 Conference Proceedings

- Krutein, K., Boyle, L., & Goodchild, A. (2023). A meta-heuristic solution approach to isolated evacuation problems. (pp. 2002–2012). 2022 Winter Simulation Conference (WSC). doi:<https://doi.org/10.1109/WSC57314.2022.10015470>
- Krutein, K., & Boyle, L. (2019). Systematic approach for the design of flight simulator studies. (Vol. 63, pp. 833–837). Proceedings of the Human Factors and Ergonomics Society Annual Meeting. doi:<https://doi.org/10.1177/1071181319631524>

Teamwork  
Organization  
Initiative  
Decision Making  
Innovation



## LANGUAGES

English  
German  
French  
Spanish



## EDUCATION

Ph.D. in Industrial Engineering

University of Washington

📅 2019 - 2022 📍 Seattle, WA

Dissertation: Optimization Modeling Approaches to Evacuations of Isolated Communities

M.S. in Industrial Engineering

University of Washington

📅 2017 - 2019 📍 Seattle, WA

B.Sc. in Industrial Engineering & Business Management

FH Nordakademie (University of Applied Sciences Nordakademie)

📅 2013 - 2017 📍 Elmshorn, Germany

Thesis: Framework for a Stock Optimization Strategy

Certificate of Proficiency in Industrial Engineering

University of Auckland

📅 2015 - 2016 📍 Auckland, New Zealand

## AWARDS

Fellowship for High Potentials

Foundation of German Business (SDW)

📅 2013 - 2019

Fellowship for Graduate Studies Abroad

German Academic Exchange Service (DAAD)

📅 2017 - 2019

Fellowship for International Exchange

Institute Ranke Heinemann

📅 2015