KLAAS FIETE KRUTEIN, PH.D.

Operations Research and Applied Scientist

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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.
- 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

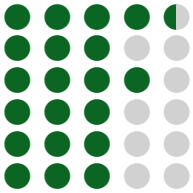
Personal Growth
experienced through balancing technical skills with project leadership and interdisciplinary collaboration to maximize impact of OR tools at Convoy

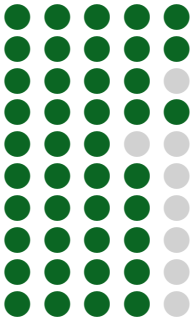
STRENGTHS

Research | Innovator | Team Worker | Leader | Problem Solver

Optimization | Machine Learning | Simulation | Experiments | Statistics | Data Visualization | Cloud Computing | Linear & Non-Linear Programming

PROGRAMMING & TOOLS





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

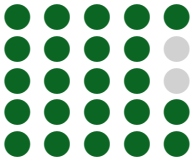
Journal Articles

- 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.ijdrr.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/10.1177/03611981211003575

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