

ICCL 2020

11th International Conference on Computational Logistics

University of Twente, The Netherlands (to be held online)

September 28-30, 2020

CONFERENCE PROGRAM

Version September 19, 2020

Conference schedule at a glance

Monday, September 28, 2020			
13:00-13:30	Welcome		
13:30-15:00	Collaborative freight transport	Maritime case studies	Public transport
15:00-15:15	Break		
15:15-16:15	Plenary prof. Warren Powell: Automating Transportation and Logistics in the Digital Age: Past, present and future challenges		
16:15-16:30	Break		
16:30-18:00	Inventory routing	Trains & barges	Cooperation in transport

Tuesday, September 29, 2020			
10:30-12:00	Dynamic VRPs	Yard operations	Shared mobility
12:00-13:00	Lunch		
13:00-14:30	Rich VRPs	Automated transport	Mobility & positioning
14:30-14:45	Break		
14:45-16:15	Inventory routing 2	Port operations	Warehousing & e-commerce
16:15-16:30	Break		
16:30-18:00	Exact routing approaches	Synchromodal transport	Routes & travel times

Wednesday, September 30, 2020			
13:00-14:30	Sustainable transport	Uncertainty in freight transport	Markov Decision Processes
14:30-14:45	Break		
14:45-15:45	Plenary prof. Rob Zuidwijk: Container transport: innovative practices meet academic discourse		
15:45-16:00	Break		
16:00-17:30	Fleets, vehicles & transfers	Intermodal transport	Bin packing
17:30-18:00	Closing		

Monday, September 28, 2020

13:00-13:30 Welcome

13:30-15:00 Parallel sessions

Collaborative freight transport¹ Chair: Nadia Pourmohammadzia	Maritime case studies Chair: Lennart C. Johnsen	Public transport Chair: Stefan Voß
<p>Waterborne Hinterland Transports for Floating Port Terminals. <i>Gerrit Assbrock, Jens Ley, Ioannis Dafnomilis, Mark B. Duinkerken and Dingena L. Schott</i> (62)</p> <p>Towards a Unifying Framework for Self-Organization in Transport Logistics. <i>Berry Gerrits</i> (86)</p> <p>Decentralized Combinatorial Auctions for Dynamic and Large-Scale Collaborative Vehicle Routing. <i>Johan Los, Frederik Schulte, Margaretha Gansterer, Richard F. Hartl, Matthijs T. J. Spaan and Rudy R. Negenborn</i> (46)</p>	<p>Evaluating Port Development Strategies for a Modal Shift: a Norwegian Case Study. <i>Andreas Breivik Ormevik, Stein Ove Erikstad and Kjetil Fagerholt</i> (5)</p> <p>Analyzing the Impact of the Northern Sea Route on Tramp Ship Routing with Uncertain Cargo Availability. <i>Mingyu Li, Kjetil Fagerholt and Peter Schütz</i> (22)</p> <p>Ferry Service Network Design for the Kiel Fjord. <i>Ingvild E. Aslaksen, Elisabeth Svanberg, Kjetil Fagerholt, Lennart C. Johnsen and Frank Meisel</i> (12)</p>	<p>Developing robust electric bus systems through simultaneous optimization of charging infrastructure and vehicle schedules. <i>Miriam Stumpe, David Rößler, Guido Schryen and Natalia Kliewer</i> (19)</p> <p>Improving the performance of a traffic system by fair rerouting of travelers. <i>Oskar A.L. Eikenbroek, Georg Still and Eric van Berkum</i> (75)</p> <p>Robustness and Disturbances in Public Transport. <i>Liping Ge, Stefan Voß and Lin Xie</i> (57)</p>

15:00-15:15 Break

15:15-16:15 Plenary talk

Prof. Warren Powell: Automating Transportation and Logistics in the Digital Age: Past, present and future challenges. Chair: Martijn Mes
<p>Amazon and Uber have shown the way to the digital era in transportation and logistics in the post-2000 era, exploiting the power of the internet and the explosive growth in the use of smartphones. Less visible is the growth of major freight companies such as UPS, DHL, FedEx, along with major shipping companies such as Maersk and domestic postal services. Today, there is an explosion of services that require fast delivery of products and services with 2-day, same-day and real-time response.</p> <p>Today, we are looking at the possibility of fully-digital transportation operations, where people primarily monitor systems while computers perform all the “thinking” tasks previously performed by people. We have become accustomed to using statistical models and machine learning to perform inference and prediction. The next phase will be using computers to make decisions, especially those implemented in an operational setting.</p> <p>I will talk about the evolution of modern analytics in transportation and logistics, beginning with network models and heuristics in the 1970s and 1980s, and the emergence of powerful deterministic optimization solvers in the 1980’s and 1990’s. Throughout this period, transportation companies have had to deal with uncertainty, but only recently have we started to develop the type of general modeling frameworks long enjoyed by deterministic optimization. I will give the highlights of this framework, and then bring out the challenges that still remain in the path to full automation.</p>

16:15-16:30 Break

16:30-18:00 Parallel sessions

Inventory routing Chair: Michael Römer	Trains & barges Chair: Janis S. Neufeld	Cooperation in transport Chair: Wouter van Heeswijk
<p>Time-dependent travel-time constrained Inventory Routing Problem. <i>Fayçal Touzout, Anne-Laure Ladier and Khaled Hadj-Hamou</i> (20)</p> <p>Inventory routing in a city logistics context: review and collaborative model. <i>Titi Iswari, Kris Braekers and An Caris</i> (78)</p> <p>Cyclical Inventory Routing with Unsplittable Pick-up and Deliveries. <i>Jakob Schulte, Michael Römer and Kevin Tierney</i> (53)</p>	<p>Pickup and delivery problem with transshipment for inland waterway transport. <i>Yimeng Zhang, Bilge Atasoy, Dimitris Souravlias and Rudy Negenborn</i> (9)</p> <p>An Ant Colony Optimisation vs. a Branch and Bound Approach for the Robust Train Marshalling Problem. <i>Abtin Nourmohammadzadeh and Stefan Voß</i> (80)</p> <p>Daily Distribution of Duties for Crew Scheduling with Attendance Rates: A Case Study. <i>Martin Scheffler and Janis S. Neufeld</i> (25)</p>	<p>Quantifying the Effect of Flexibility and Information Sharing in Transportation Planning. <i>Ebba Celius, Madeleine Reehorst, Heidi Dreyer and Peter Schütz</i> (21)</p> <p>Introducing Cooperativeness for Agrobotics: An Agent-Based Approach. <i>Stef Bunte</i> (84)</p> <p>Smart Containers With Bidding Capacity: A Policy Gradient Algorithm for Semi-Cooperative Learning. <i>Wouter van Heeswijk</i> (13)</p>

¹ Special session on Collaborative Freight Transportation

Tuesday, September 29, 2020

10:30-12:00 Parallel sessions:

Dynamic VRPs Chair: Frank Meisel	Yard operations Chair: Shunji Tanaka	Shared mobility² Chair: Breno Beirigo
Dynamic Assignment Vehicle Routing Problem with Time Windows. <i>Kim Los, Frank Phillipson, Elisah Van Kempen, Hans Quak and Uilke Stelwagen</i> (15)	An optimization model for defining the storage strategies for an export yard in container terminals: a case study. <i>Daniela Ambrosino and Haoqi Xie</i> (64)	Formulations of a carsharing pricing and relocation problem. <i>Giovanni Pantuso</i> (4)
The Multistage Stochastic Vehicle Routing Problem with Dynamic Occasional Drivers. <i>Jørgen Skålnes, Lars Dahle, Henrik Andersson, Marielle Christiansen and Lars Magnus Hvattum</i> (58)	Extended tree-based Properties and Heuristics for the Preemptive Stacker Crane Problem. <i>Benjamin Graf</i> (76)	Dynamic Pricing for User-Based Rebalancing in Free-Floating Vehicle Sharing: A Real-World Case. <i>Nout Neijmeijer, Frederik Schulte, Kevin Tierney, Henk Polinder and Rudy Negenborn</i> (60)
Eco-Labeling in Dynamic Vehicle Routing as a Markov Decision Process. <i>Arne Heinold and Frank Meisel</i> (77)	An improved branch-and-bound algorithm for the block relocation problem to minimize total working time under a realistic crane trajectory model. <i>Shunji Tanaka and Akira Shikida</i> (38)	Overcoming Mobility Poverty with Shared Autonomous Vehicles: A Learning-Based Optimization Approach for Rotterdam Zuid. <i>Breno Beirigo, Frederik Schulte and Rudy Negenborn</i> (71)

12:00-13:00 Lunch

13:00-14:30 Parallel sessions

Rich VRPs Chair: Simona Mancini	Automated transport Chair: Frederik Schulte	Mobility & positioning Chair: Xiaoning Shi
Vehicle Routing Problem with Reverse Cross-Docking: an Adaptive Large Neighborhood Search Algorithm. <i>Aldy Gunawan, Audrey Tedja Widjaja, Pieter Vansteenwegen and Vincent F. Yu</i> (30)	Introducing smart yards: a new concept in smart transport logistics. <i>Jelle van Heuveln</i> (85)	Idle vehicle repositioning for dynamic ride-sharing. <i>Martin Pouls, Anne Meyer and Nitin Ahuja</i> (8)
Solving a Bi-Objective Rich Vehicle Routing Problem with Customer Prioritization. <i>Tim van Benthem, Mark Bergman and Martijn Mes</i> (33)	Automated and Autonomous Driving in Freight Transport - Opportunities and Limitations. <i>Joachim R. Daduna</i> (61)	Minimizing Movements in Location Problems with Mobile Recycling Units. <i>Eduardo Alarcon-Gerbier and Udo Buscher</i> (43)
Metaheuristic Approaches for the Step Cost Functions in a Fleet Size and Mix Vehicle Routing Problem with Time Windows. <i>João Manguino and Débora Ronconi</i> (51)	Platooning of Automated Ground Vehicles to Connect Port and Hinterland: A Multi-Objective Optimization Approach. <i>Nadia Pourmohammad-Zia, Frederik Schulte, Dimitris Souravlias and Rudy R. Negenborn</i> (54)	Smart City: A Perspective of Emergency and Resilience at a Community Level in Shanghai. <i>Xiaoning Shi, Wenchen Sun, Stefan Voß and Jiangang Jin</i> (66)

14:30-14:45 Break

14:45-16:15 Parallel sessions:

Inventory routing 2 Chair: William Guerrero	Port operations Chair: Kjetil Fagerholt	Warehousing & e-commerce Chair: Kris Braekers
The Multi-Period Petrol Station Replenishment Problem: Formulation and Solution Methods. <i>Luke Boers, Bilge Atasoy, Goncalo Correia and Rudy R. Negenborn</i> (10)	A self-adaptive hybrid search technique using the integration of two intelligent crossover operators and an augmented local search for solving the quadratic semi-assignment problem. <i>Mehrdad Amirghasemi, Reza Zamani and Stefan Voß</i> (82)	Game Theoretic Analysis of State Interventions to Reduce Customer Returns in E-commerce. <i>Maria Beranek</i> (6)
Distance Approximation for Dynamic Waste Collection Planning. <i>Fabian Akkerman, Martijn Mes and Wouter Heijnen</i> (24)	New formulation and solution algorithm for the Strategic Berth Template Problem. <i>Elena Fernández and Manuel Munoz-Marquez</i> (93)	Increasing the practical applicability of order picking operations by integrating classification, labelling and packaging regulations. <i>Sarah Vanheusden, Teun van Gils, Katrien Ramaekers and An Caris</i> (34)
Cash Distribution Model with Safety Constraints. <i>William Guerrero, Angélica Sarmiento and Cristian Martinez</i> (72)	Stowage Planning with Optimal Ballast Water. <i>Beizhen Jia, Kjetil Fagerholt, Line Blander Reinhardt and Niels Gorm Malý Rytter</i> (35)	Online integrated order batching, picker routing and picker scheduling in a warehouse. <i>Ruben D'Haen, Kris Braekers and Katrien Ramaekers</i> (83)

² Special session on Shared (Autonomous) Mobility

16:15-16:30 Break

16:30-18:00 Parallel sessions

Exact routing approaches <i>Chair: Kevin Tierney</i>	Synchromodal transport <i>Chair: Thibault Delbart</i>	Routes & travel times <i>Chair: Rhyd Lewis</i>
<p>An integer programming model for a food distribution problem with trucks and deliverymen. <i>Claudio Sandoval, Giovanni Campuzano and Germán Paredes-Belmar</i> 90</p> <p>An Integer Programming approach for the Traveling Salesman Problem with release dates and completion time minimization. <i>Agustin Montero, Isabel Mendez-Díaz and Juan José Miranda-Bront</i> (74)</p> <p>A Mathematical Model to Route Technicians for Inland Waterway Shipping. <i>Melissa Buballa, Daniel Wetzal, Kay Lenkenhoff and Kevin Tierney</i> (42)</p>	<p>Comparison of Manual and Automated Decision-Making with a Logistics Serious Game. <i>Martijn Mes and Wouter van Heeswijk</i> (28)</p> <p>Learning-based co-planning for improved container, barge and truck routing. <i>Rie Larsen, Bilge Atasoy and Rudy Negenborn</i> (63)</p> <p>Uncertainty in intermodal and synchromodal transport. <i>Thibault Delbart, Yves Molenbruch, Kris Braekers and An Caris</i> (91)</p>	<p>Evolutionary approach for the multi-objective bike routing problem. <i>Pedro Nunes, Ana Moura and José Santos</i> (11)</p> <p>Travel Time Prediction using Tree-Based Ensembles. <i>He Huang, Martin Pouls, Anne Meyer and Markus Pauly</i> (44)</p> <p>A Heuristic Algorithm for Finding Attractive Fixed-Length Circuits in Street Maps. <i>Rhyd Lewis</i> (26)</p>

Wednesday, September 30, 2020

13:00-14:30 Parallel sessions

Sustainable transport <i>Chair: Rosa González-Ramírez</i>	Uncertainty in freight transport³ <i>Chair: Bilge Atasoy</i>	Markov Decision Processes <i>Chair: Wouter van Heeswijk</i>
<p>A Genetic Algorithm to Minimise Number of Vehicles in Electric Vehicle Routing Problem. <i>Bertran Queck and Hoong Chuin Lau</i> (40)</p> <p>Pricing and Quality Investments: An environmental and economic dilemma. <i>Arka Mukherjee and Margarida Carvalho</i> (32)</p> <p>Cumulative VRP with Time Windows: a trade-off analysis. <i>Alejandro Fernández Gil, Mariam Gómez Sánchez, Eduardo Lalla-Ruiz and Carlos Castro</i> (69)</p>	<p>Fair User Equilibrium in a Transportation Space-Time Network. <i>Lianne Bruijns, Frank Phillipson and Alex Sangers</i> (17)</p> <p>Simulation Approach for Container Assignment under Uncertainty. <i>Wouter de Koning, Frank Phillipson and Irina Chiscop</i> (41)</p> <p>Robust optimization for premarshalling with uncertain priority classes. <i>Sven Boge, Marc Goerigk and Sigrid Knust</i> (81)</p>	<p>Dynamic programming for the time-dependent traveling salesman problem with time windows. <i>Gonzalo Lera Romero, Juan Jose Miranda Bront and Francisco Soullignac</i> (92)</p> <p>Sending e-commerce returns straight to the next customer with MCTS and ADP. <i>Eline Tetteroo and Carl Van Heijst</i> (37)</p> <p>Deep Reinforcement Learning and Optimization Approach for Multi-echelon Supply Chain with Uncertain Demands. <i>J. C. Alves and G. R. Mateus</i> (56)</p>

14:30-14:45 Break

14:45-15:45 Plenary talk

Prof. Rob Zuidwijk: Container transport: innovative practices meet academic discourse. Chair: Eduardo Lalla
<p>The international transport of maritime containers employs multiple transport means, such as deep-sea vessels and trucks, or alternatively river barges and train sets. The planning and execution of combined transport operations is challenging, since resources are to be orchestrated efficiently while delivery of service must be reliable. To address these challenges, the port of Rotterdam and its hinterland have become a living laboratory, where practitioners are performing pilot studies and academics develop new methods to put innovative logistics concepts to the test.</p> <p>In the presentation, I will discuss how Synchromodal transport solutions offer mobility of freight instead of specific transport capacity. Containers that need to be transported are matched with transport options in a dynamic way. Practitioners have demonstrated the feasibility of the concept, while academics have elaborated on various decision models in support of e.g. network design, capacity planning, and routing. The living lab now progressively involves new modes of transport, such as semi-automated trucks that dynamically form platoons where consolidation is viable.</p> <p>Advanced planning concepts, where multiple modes of transport are involved, tend to be more data intensive. However, the transportation industry is progressively recognizing the value of data as a strategic asset, not to be shared without compensation. Therefore, a proper understanding of what data is needed to enhance quality of planning is key. In some cases, a marginal improvement of data quality may already help create better prognostics and planning. In this vein, academics have been able to feed their methods and insights back to practitioners. As such, container transport connects innovative practices and academic discourse.</p>

³ Special session on Behavior and Uncertainty in Freight Transport

15:45-16:00 Break

16:00-17:30 Parallel sessions

Fleets, vehicles & transfers Chair: Rhyd Lewis	Intermodal transport Chair: Frank Phillipson	Bin packing Chair: Elena Fernández
<p>The Fleet Scheduling Problem for Airlines with Stochastic Passenger Demands: Mathematical Modelling and a Genetic Algorithm Approach. <i>Abtin Nourmohammadzadeh and Stefan Voß</i> (79)</p> <p>Vehicle routing with time windows and stochastic demands: a case study. <i>Silia Mertens, Yves Molenbruch, Kris Braekers, An Caris, Tias Guns, Maxime Mulamba and Ahmed Kareem Abdullah</i> (88)</p> <p>A Shortest Path Algorithm for Graphs Featuring Transfer Costs at their Vertices. <i>Rhyd Lewis</i> (3)</p>	<p>A global intermodal shipment matching problem under travel time uncertainty. <i>Wenjing Guo, Bilge Atasoy, Wouter Beelaerts van Blokland and Rudy R. Negenborn</i> (27)</p> <p>Towards self-organized logistics in the last-mile container hinterland transportation: a case study in The Netherlands. <i>Diederik de Bruin</i> (87)</p> <p>Cutting Planes for Solving Logistic Flow Problems. <i>Kishan Kalicharan, Frank Phillipson and Alex Sangers</i> (16)</p>	<p>A Bin Packing Problem with Mixing Constraints for Containerizing Items for Logistics Service Providers. <i>Sajini Anand P S and Stefan Guericke</i> (23)</p> <p>Reactive GRASP-based Algorithm for Pallet Building Problem with Visibility and Contiguity Constraints. <i>Manuel Iori, Marco Locatelli, Mayron C.O. Moreira and Tiago Silveira</i> (55)</p> <p>A Solution Approach to the Nesting Problem of Rectangles with Arbitrary Rotations in Containers of Irregular Convex and Non-Convex Shapes. <i>Alexandre Romanelli and André Amaral</i> (70)</p>

17:30-18:00 Closing