ICCL 2021

12th International Conference on Computational Logistics

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

September 27-29, 2021

CONFERENCE PROGRAM

Version September 14, 2021

For talks indicated with an asterisk (*), you can only study an abstract up front, whereas for the other talks a Springer LNCS paper will be made available during the conference.

Conference schedule at a glance

Monday, September 27, 2021			
13:00-13:30	Welcome		
13:30-15:00	Mobility	Allocation	Data-Driven Maritime Operations
15:00-15:15	Break		
15:15-16:15	Plenary prof. dr. Iris Vis *Recent and Future Developments in Supply Chain Coordination*		
16:15-16:30	Break		
16:30-18:00	Ride Sharing	Supply Chain Management	Seaside Logistics

Tuesday, September 28, 2021			
10:30-12:30	Drone-Assisted Transport	Inventory and Production	Container Loading
12:30-13:30	Lunch		
13:30-15:00	Deep Reinforment Learning	Multi-Agent Systems	Drilling Operations
15:00-15:15	Break		
15:15-16:15	Plenary prof. Manuel Iori *Dynamic Optimization Algorithms for Same-Day Delivery Problems*		
16:15-16:30	Break		
16:30-18:00	Sustainability	Multi-Objective Optimization	Maritime Transport

Wednesday, September 29, 2021			
13:00-14:30	Machine Learning	Storage Management	Dispatching
14:30-14:45	Break		
14:45-15:45	Industry talk Dr. Leonard Heilig *Digitalization in Maritime Logistics and the Role of Research*		
15:45-16:00	Break		
16:00-17:30	Routing	Warehousing	Multi-Modal Transport
17:30-18:00	Closing		

Monday, September 27, 2021

13:00-13:30 Welcome

13:30-15:00 Parallel sessions

Mobility ***Chair: Xiaoning Shi***	**Allocation** ***Chair: Javier Maturana-Ross***	**Data-Driven Maritime Operations** ***Chair: Peter Wenzel***
Smart City: A Perspective of Observations and Scenarios on Advanced Public Transport in Hamburg*. *Günay Dogan, Xiaoning Shi and Stefan Voß (101).* Analysis of Schedules for Rural First/Last Mile Microtransit Services. *Christian Truden, Mario Ruthmair and Martin J. Kollingbaum (67).* Online Order Dispatching and Vacant Vehicles Rebalancing for the First-mile Ride-sharing Problems using autonomous vehicles*. *Jinwen Ye, Giovanni Pantuso and David Pisinger (20)*	A Branch-and-Cut Algorithm for Aircraft Routing with Crew Assignment for On-demand Air Transportation. *Rafael Campos, Thiago Vieira and Pedro Munari* (76) Branch-and-Price-and-Cut Algorithm for the Capacitated Single Allocation Hub Location Routing Problem*. *Yuehui Wu, Ali Gul Qureshi and Tadashi Yamada (90).* Vaccine Allocation to Prioritize the Vulnerable Population in Mexico*. *Linda Martinez-Fantini and Fabiola Regis-Hernandez (105)*	Simulation of an AIS System for the Port of Hamburg. *Pierre Bouchard, Adriana Moros Daza and Stefan Voß* (44). Destination Prediction of Oil Tankers Using Graph Abstractions and Recurrent Neural Networks. *Búgvi Benjamin Magnussen, Nikolaj Bläser, Rune Møller Jensen and Kenneth Ylänen* (56) Predictive Inland Waterway Transportation Using Machine Learning and RIS Data*. *Peter Wenzel, Rudy Negenborn and Frederik Schulte* (103).

15:00-15:15 Break

15:15-16:15 Plenary talk

Prof. Iris Vis*:* Recent and Future Developments in Supply Chain Coordination. ***Chair: Martijn Mes***
Logistics networks evolve more and more towards fully open and connected physical internet networks. Developments as the sharing economy, platform technology, and self-organizing concepts start to play a role in supply chains. In this presentation, the vision of the Physical Internet (PI) will be introduced in more detail and new interdisciplinary research ideas will be discussed. In the second part of the presentation, several scientific insights will be shared related to various research projects on the concept of the physical internet. Specifically, results will be presented from the NWO/TKI Dinalog project 'Towards Virtual Ports in a Physical Internet' that aimed to develop models and tools to support ports and businesses in hinterland networks in their decision making related to participation in PI networks.

16:15-16:30 Break

16:30-18:00 Parallel sessions

Ride Sharing ***Chair: Pieter Smet***	**Supply Chain Management** ***Chair: Alessandro Hill***	**Seaside Logistics** ***Chair: Frederik Schulte***
The Share-A-Ride Problem with Integrated Routing and Design Decisions: The Case of Mixed-Purpose Shared Autonomous Vehicles. *Max van der Tholen, Breno Beirigo, Jovana Jovanova and Frederik Schulte* (78). Real-Time Dispatching with Local Search Improvement for Dynamic Ride-Sharing. *Martin Pouls, Katharina Glock and Anne Meyer* (7). Algorithms for the Design of Round-trip carsharing Systems with a Heterogeneous Fleet. *Pieter Smet, Emmanouil Thanos, Federico Mosquera and Toni Ismael Wickert* (5).	Smarter Relationships? The Present and Future Scope of AI Application in Buyer-Supplier Relationships. *Anna-Maria Nitsche, Markus Burger, Julia Arlinghaus, Christian-Andreas Schumann and Bogdan Franczyk* (24). The Effect of Sparse Data on the Performance of Machine Learning Techniques for Supply Chain Visibility*. *Isabelle M. van Schilt, Jan Kwakkel and Alexander Verbraeck* (99). An Analysis of an Optimization Model Incorporating Risk into a Stochastic Supply Chain applied to an Energy System*. *Yajaira Cardona Valdés, Krystel Castillo-Villar and Esteban Andres García Granados* (108).	An Integrated Planning, Scheduling, Yard Allocation and Berth Allocation Problem in Bulk Ports: Model and Heuristics. *João Luiz Marques de Andrade and Gustavo Campos Menezes* (19). The Multi-Port Berth Allocation Problem with Speed Optimization: Exact Methods and a Cooperative Game Analysis*. *Bernardo Martin-Iradi, Dario Pacino and Stefan Ropke* (89). A Collaborative Berth Planning Model in Response to Disruptions*. *Xiaohuan Lyu and Frederik Schulte* (102).

Tuesday, September 28, 2021

10:30-12:30 Parallel sessions:

Drone-Assisted Transport ***Chair: Robert van Steenbergen***	**Inventory and Production** ***Chair: Adhe Kania***	**Container Loading** ***Chair: Alessio Trivella***
Exact Separation Algorithms for the Parallel-Drone-Scheduling-Traveling-Salesman-Problem. *Tobias Klein and Peter Becker* (25). A VNS Algorithm for the TSP-D with Energy Constraints. *Giovanni Campuzano, Eduardo Lalla-Ruiz and Martijn Mes* (71) Last Mile Relief Distribution with Trucks and Drones under Uncertainty*. *Robert van Steenbergen and Martijn Mes* (111).	Production Scheduling with Stock- and Staff-related Restrictions. *Carlo S. Sartori, Vinícius Gandra, Hatice Çalik and Pieter Smet* (23). New Valid Inequalities for a Multi-Echelon Lot-Sizing Problem with Returns and Lost Sales. *Franco Quezada, Céline Gicquel and Safia Kedad-Sidhoum* (57). The Craft Beer Game and the Value of Information Sharing. *Joshua Grassel, Alfred Craig Keller, Alessandro Hill and Frederik Schulte* (63). Interactive Multi-Objective Optimization in Lot Sizing Problem with Safety Stock and Safety Lead Time. *Adhe Kania, Juha Sipilä, Bekir Afsar and Kaisa Miettinen* (61).	Designing a Physical Packing Sequence Algorithm with Static Stability for Pallet Loading Problems in Air Cargo. *Philipp Gabriel Mazur, No-San Lee, Detlef Schoder and Tabea Janssen* (26) Vertical Stability Constraints in Combined Vehicle Routing and 3D Container Loading Problem. *Corinna Krebs and Jan Fabian Ehmke* (27). Analysis of the Impact of Physical Internet on the Container Loading Problem. *Ana Rita Ferreira, Galrão Ramos and Elsa Silva* (45). Models and Methods for the Multi-Drop Container Loading Problem with Soft Unloading Constraints*. *Guillem Bonet Filella, Alessio Trivella and Francesco Corman* (54).

12:30-13:30 Lunch

13:30-15:00 Parallel sessions

Deep Reinforcement Learning ***Chair: Amin Asadi***	**Multi-Agent Systems** ***Chair: Vahid Yazdanpanah***	**Drilling Operations** ***Chair: Xiaoning Shi***
Tackling Uncertainty in Online Multimodal Transportation Planning using Deep Reinforcement Learning. *Amirreza Farahani, Laura Genga and Remco Dijkman* (58). Deep Reinforcement Learning with a Combinatorial Action Space for Solving Stochastic Crowd Shipping Last-Mile Delivery problems*. *Marco Silva, Joao Pedro Pedroso and Ana Viana* (100). Deep Reinforcement Learning for Routing and Allocation Decisions in Logistics*. *Fabian Akkerman, Martijn Mes and Willem van Jaarsveld* (110).	Automated Negotiation for Supply Chain Finance. *Alexandra Fiedler and Dirk Sackmann* (18). A Hybrid Local Search for the Trailers Waiting Time Minimization in Warehouse Logistics*. *Alexey Ratushny and Yury Kochetov* (91). Formal Methods to Verify and Ensure Self-Coordination Abilities in the Internet of Vehicles. *Vahid Yazdanpanah, Enrico Gerding and Sebastian Stein* (88).	Scheduling Drillships in Offshore Activities. *Rafael Gardel Azzariti Brasil, Marco Aurelio de Mesquita, Dario Ikuo Miyake, Tiago Montanher and Debora Pretti Ronconi* (64). The Robust Rig Routing with Drilling Time uncertainty*. *Igor Kulachenko and Polina Kononova* (96). Collaborative Decision Making for a Multi-Actor Platform – A Case of an Offshore Drilling Operation*. *Juan M. Pulido and Xiaoning Shi* (97).

15:00-15:15 Break

15:15-16:15 Plenary talk

Prof. Manuel Iori*:* Dynamic Optimization Algorithms for Same-Day Delivery Problems. ***Chair: Eduardo Lalla-Ruiz***

In this talk, we will concentrate on dynamic vehicle routing problems where stochastic customers request urgent deliveries characterized by restricted time windows. The most important problem in this class is known as the same-day delivery problem and requires maximizing the number of served requests, breaking ties by minimizing traveled distance. The problem is of high importance because models several real-world applications, including the delivery of online purchases, and has received large attention in recent years.

After a general introduction on dynamic vehicle routing, we will present a set of dynamic solution approaches for the same-day delivery problem, ranging from simple reoptimization heuristics to sophisticated branch-and-regret ones in which sampled scenarios are used to anticipate decisions. We will also discuss how to embed adaptive large neighborhood search in the dynamic approaches to optimize the routing plans, and how to use consensus functions to select routing plans for implementation. The effectiveness of the methods in comparison with recent literature is proved by extensive experiments.

We will finally discuss ways to adapt the proposed methods to solve other dynamic problems that we are currently facing together with companies, as the routing of Automated Guided Vehicles within an industrial plant, and the transportation of patients within a hospital.

16:15-16:30 Break

16:30-18:00 Parallel sessions:

Sustainability ***Chair: Patricia Rogetzer***	**Multi-Objective Optimization** ***Chair: Abtin Nourmohammadzadeh***	**Maritime Transport** ***Chair: Peter Schütz***
Machine Learning for Promoting Environmental Sustainable Container Terminals. *Meead Mansoursamaei, Mahmoud Moradi, Rosa Gonzalez and Eduardo Lalla-Ruiz* (106) Bi-objective Optimization for Joint Production Scheduling and Distribution Problem with Sustainability. *Ece Yağmur and Saadettin Erhan Kesen* (51). Optimization of Green Pickup and Delivery Operations in Multi-Depot Distribution Problems. *Alejandro Fernández Gil, Eduardo Lalla-Ruiz, Martijn Mes and Carlos Castro* (83).	A Multi-Objective Biased Random-Key Genetic Algorithm for the Service Technician Routing and Scheduling Problem. *Ricardo Damm and Débora Ronconi* (59). Solving a Multi-Objective Vehicle Routing Problem with Synchronization Constraints. *Briseida Sarasola and Karl F. Doerner* (62). Robust Multi-Objective Gate Scheduling at Hub Airports Considering Flight Delays: A Hybrid Metaheuristic Approach. *Abtin Nourmohammadzadeh and Stefan Voß* (75).	Solving a Real-Life Tramp Ship Routing and Scheduling Problem with Speed Profiles. *Lucas Louzada, Rafael Martinelli and Victor Abu-Marrul* (80). Optimizing Maritime Preparedness under Uncertainty - Locating Tugboats along the Norwegian Coast. *Julie Louise Musæus, Håkon Nøstvik, Henrik Andersson and Peter Schütz* (81). Designing the Hydrogen Supply Chain for Maritime Transportation in Norway. *Šárka Štádlerová and Peter Schütz* (52).

Wednesday, September 29, 2021

13:00-14:30 Parallel sessions

Machine Learning ***Chair: Lena Schmid***	**Storage Management** ***Chair: Sven Boge***	**Dispatching** ***Chair: Safa Layeb***
A Learning and Optimization Framework for Collaborative Urban Delivery Problems with Alliances. *Jingfeng Yang and Hoong Chuin Lau* (48). Improving the Location of Roadside Assistance Resources through Incident Forecasting. *Roman Buil Giné, Santiago Garcia Serrano, Jesica de Armas and Daniel Riera* (82). Chances of Interpretable Transfer Learning for Human Activity Recognition in Warehousing. *Michael Kirchhof, Lena Schmid, Christopher Reining, Michael ten Hompel and Markus Pauly* (31).	On the Effect of Product Demand Correlation on the Storage Space Allocation Problem in a Fast-Pick Area of a Warehouse. *Felipe I. Gre-Carafí, Alberto Ossa-Ortiz de Zevallos, Rosa G. González-Ramírez and Mario C. Velez-Gallego* (74). Stockyard Storage Space Allocation in Large Iron Ore Terminals*. *Xinyu Tang, Jiangang Jin and Xiaoning Shi* (92). The Parallel Stack Loading Problem on Large Scale Instances*. Sven Boge and Irina Wanscheid (95).	Automated Tour Planning for Driving Service of Children with Disabilities: A Web-Based Platform and a Case Study. Mahdi Moeini and Lukas Mees (36). Applying the Flow Interception Problem to a Fugitive Situation*. *Irene van Droffelaar, Jan Kwakkel and Alexander Verbraeck* (98) On solving the Equipment Dispatching Problem for Underground Mine Under Stochastic Working Times. *Nour El Houda Hammami, Amel Jaoua and Safa Bhar Layeb* (8).

14:30-14:45 Break

14:45-15:45 Plenary talk

Dr. Leonard Heilig: Digitalization in Maritime Logistics and the Role of Research. ***Chair: Stefan Voß***

Digitalization is pushing the maritime industry beyond its traditional limits and provides many new opportunities to enhance the productivity, efficiency, and sustainability of logistics. In recent years, we have seen a lot of new real-world applications of digital technologies and platforms in the domain of maritime logistics, such as related to the internet of things (IoT), cloud computing, blockchain, smartphones, etc., combined with new business models. This talk will give an overview on opportunities and challenges coming along with the application of digital technologies, especially with respect to seaport and hinterland operations. In this context, examples will be presented and the role of research in the areas of operations research and data science will be discussed.

The second part of the presentation contains several scientific and practical insights from driveMybox, an innovative digital container trucking platform, which demonstrates a successful transition from research into practice. driveMybox is the first digital all-in-one platform that fully supports processes from the booking in a modern cloud-based platform to the execution using a trucker app, with optimization and machine learning approaches at its core and full transparency for customers. Opportunities for future research will be discussed in this context.

15:45-16:00 Break

16:00-17:30 Parallel sessions

Routing ***Chair: Rosa González-Ramirez***	**Warehousing** ***Chair: Flora Hofmann***	**Multi-Modal Transport** ***Chair: Wouter van Heeswijk***
Solving the Shipment Rerouting Problem with Quantum Optimization Techniques. *Sheir Yarkoni, Andreas Huck, Hanno Schülldorf, Benjamin Speitkamp, Marc Shakory Tabrizi, Martin Leib, Thomas Bäck and Florian Neukart (12).* Minimizing the Expected Cost in a Dynamic Stochastic Last Mile Delivery with Crowdsourcing*. *André G. Santos, Xenia Klimentova, Ana Viana and João Pedro Pedroso* (107). First Mile Logistics Operational Planning Model for Small Fresh-Produce Growers*. *Nicolas E. Palacios-Avilés, Rosa Guadalupe Gonzalez Ramirez, Omar Ahumada Valenzuela and J. Rene Villalobos* (93).	Layout-Agnostic Order Batching Optimization. *Johan Oxenstierna, Jacek Malec and Volker Krueger* (15). A Multi-Periodic Modelling Approach for Integrated Warehouse Design and Product Allocation. *Martin Scheffler, Lisa Wesselink and Udo Buscher (32).* The Effect of Order Batching on a Cyclical Order Picking System. *Flora Hofmann and Stephan Visagie* (43).	Applying Constraint Programming to the Multi-Mode Scheduling Problem in Harvest Logistics. *Till Bender, David Wittwer and Thorsten Schmidt* (30) Multi-trip Vehicle Routing Problem with Time Windows for Waste Collection in Amsterdam*. *Çiğdem Karademir, Breno A. Beirigo, Rudy R. Negenborn and Bilge Atasoy* (109). Intermodal Competition in Freight Transport - Political Impacts and Technical. Developments. *Joachim R. Daduna (47).*

17:30-18:00 Closing (Mes/Lalla/Voß)