Seventh Workshop
of the EURO Working Group on
Vehicle Routing and Logistics optimization
3-5 June 2019, Seville (Spain)
Dear VeRoLog 2019 participant,

On behalf of the Organizing Committee and of the Scientific Committee we are very pleased to welcome you to VeRoLog 2019, the Seventh Conference of the EURO Working Group on Vehicle Routing and Logistics Optimization. The VeRoLog conference is a meeting bringing together the large community of researchers and practitioners interested in vehicle routing optimization and its relationship with logistics.

The conference is open to high quality methodological contributions, relevant real-world applications, and case studies from industry and the service sector.

VeRoLog 2019 is taking place at Fundación Cajasol, Plaza de San Francisco, 1, 41004, Seville (Spain), affiliated center of Pablo de Olavide University in Seville from 3 to 5 June, 2019. The venue is located at the heart of Seville, behind the Town Hall of the city.

The conference will meet more than 220 participants interested in sharing their latest research findings, discussing your work, and attending the parallel sessions. In total, more than 170 scientific presentations have been included in the final programme of the conference. Furthermore, VeRoLog2019 includes two plenary lectures talks by JUAN JOSÉ SALAZAR (Full Professor at University of La Laguna) and MAURICIO G. C. RESENDE (Principal Research Scientist within Amazon.com), two tutorials by JESÚS SÁNCHEZ-ORO (Rey Juan Carlos University) and ROBERTO ROBERTI (VU University Amsterdam), and two brainstorming sessions by JOAQUIM GROMICHO (ORTEC) and WERNER HEID (PTV).

Special attention has been devoted to the activities of young researchers in our community that participate to the conference in large number; we will award the VeRoLog Doctoral Dissertation Prize, chosen among numerous applicants.

We would also like to highlight the VeRoLog Solver Challenge 2019 organized by ORTEC. Selected participants will have the possibility to present during the upcoming VeRoLog conference in Seville and to publish in a special issue of the journal Networks. The winning team receives €2019, the second best €500 and the third €250. The organization and the prizes are provided by ORTEC and will be awarded during the VeRoLog conference.

Furthermore, we thank Bruce Golden and Manuel Laguna editors of Network and Journal of Heuristics, respectively, who will give the participants of the conference the possibility to submit a paper in one of the two Special Issues in these high-impact journals.
In addition to this jam-packed scientific program, we offer a series of social events to share some of the beautiful aspects of our city. A welcome reception on Sunday, June 2nd, is organized to give the participants the possibility to meet before the conference. On Monday evening, we invite you to visit the Real Alcázar de Sevilla, one of the oldest palaces in use of our time and on Tuesday evening, a social dinner is scheduled at restaurant La Casa del Estanque, in Jardines de las Delicias.

We are grateful for the generous support of the sponsors of VeRoLog 2019. These include academic partners, Pablo de Olavide University and EURO, as well as the industry partners: ORTEC and PTV Group, the strong and continued support of which attest to the relevance of this conference for those in industry. Particular sponsors that we would like to mention are qosITconsulting, Flor M. Guerrero head of the Department of Economics, Quantitative Methods and Economic History at Pablo de Olavide University, Reyes Rey from the City Hall Tourist Office, D. Antonio Pulido and his amazing team (Encarnación Berrocal, María R. Varo) from Fundación Cajasol and Rafael Cebolla and his great team (Laura and Blanca) from Eventos Grupo Batura. Special thanks are also due to the VeRoLog board and the organizers of VeRoLog Amsterdam 2017 for their advice and guidance. We are indebted to them and want to extend the favour by offering the same support to the organizers of the next VeRoLog conference. Finally, we express our sincere thanks to the countless individuals that have contributed to VeRoLog 2019.

We hope that you will enjoy staying in Seville and attending the VeRoLog 2019 conference.

The Organizing Committee of VeRoLog 2019.
VeRoLog 2019 Committees

Organizing Committee
- Alfredo G. Hernández-Díaz (chair)
- Ana D. López-Sánchez
- Jesús Sánchez-Oro
- Eva Barrena Algara
- Laura Delgado
- Julián Molina
- Rafael Caballero
- Miguel A. Hinojosa Ramos

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- Marielle Christiansen, University of Trondheim, Norway
- Ángel Corberán, University of Valencia, Spain
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- Richard Eglese, University of Lancaster, U.K.
- Geir Hasle, SINTEF, Norway
- Stefan Irnich, University of Mainz, Germany
- Frederic Semet, Ecole Centrale de Lille, France
- Maria Grazia Speranza, University of Brescia, Italy
Sponsors
The Venue

The seventh meeting of the EURO Working Group on Vehicle Routing and Logistics optimization is taking place at Fundación Cajasol, Calle Chicarreros, 1, 41004, Sevilla (Spain), affiliated center of Pablo de Olavide University in Seville. The venue is located downtown behind the city council of Seville.

Seville is located in the South of Spain, the fourth largest city in Spain. It has more than 700,000 inhabitants, nearly half the population of the whole province. Seville is situated on the banks of the Guadalquivir River that has a rich Moorish heritage and used to be a prosperous port that carried out trade with the Americas. The old town of Sevilla covers almost four-square kilometers. Representative landmarks of Sevilla are the cathedral with its famous tower, La Giralda; the Royal Alcazar, a moorish palace which displays a beautiful mixture of Mudejar and Renaissance styles, and La Torre del Oro, a defensive barrier on the river to protect the river port.
PRACTICAL INFORMATION

Coffee breaks and lunches take place at the central Patio (ground floor).

EMERGENCY NUMBERS

The international phone number prefix for Spain is +34.

- Emergency call number (preferred): 112
- Police: 091
- Ambulance: 061
- Fire brigade: 080

SOCIAL PROGRAM

Sunday, June 2, 20:00-21:00

- Get-together/Registration at Maruja Melón in Paseo de Cristóbal Colón, 11, 41001 Seville, Spain 41001

Monday, June 3, 18:30-20:30

- Guided Tour of Real Alcázar in Patio de Banderas s/n Seville, Spain 41004

Tuesday, June 4, 21:00-00:00

- Gala Dinner at La Casa del Estanque (Jardines de las Delicias) in Paseo de las Delicias s/n Seville, Spain 41012
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PLENARY TALK

Designing routes for vehicles and drivers

Monday, June 4, 9:30 - 10:30 (Room Antonio Machado)
Chairman: Prof. Daniele Vigo (University of Bologna)
Speaker: Prof. Juan José Salazar (University of La Laguna)

Most of the literature concerns the design of routes through customers for one resource (for example, a fleet of capacitated vehicles). However, it is quite common in real-world applications the need of optimizing more than one resources (for example, vehicles and drivers), both very interrelated but each one with different requirements. This talk will address some optimization problems in this category.

The motivation of our research started when solving an airline problem in Canary Islands operating about 150 flights (customers) every day. Each flight must be operated by one aircraft and one crew, and the problem is to compute optimal assignments (routes). There are eight airports in the islands, and two of them are hubs (Tenerife and Gran Canaria). To reduce overnight costs, a crew route must start and end in the same hub airport. Due to maintenance operations, each aircraft route must start and end in different hub airports. We will present different mathematical models and algorithms to find optimal routes detailed in "Omega" 43 (2014) 71-82 and "Transportation Science" 51 (2017) 250-268.

In the above problem, the flights are assumed to have a fixed departure time. We will also analyze the variant where these times can be slightly changed to find better solutions. This variant motivates a new problem where one must determine the time to start serving each customer, and design optimal routes for vehicles and drivers. In this problem synchronization constraints are crucial to guarantee feasibility of the solution. Note that in all these problems, each customer (flight) is visited (operated) by one vehicle and one driver. Although they are formulated and solved using standard elements in vehicle routing, they are scheduling problems in the sense that each customer is a task to be performed (for example, going from one airport to another airport). The new problem is called "Vehicle-and-Driver Scheduling Problem" and our research results are detailed in "Computers & Operations Research" 92 (2018) 56-64.

We will also introduce another new problem which is a more natural routing problem, in the sense that each customer is a location in the space, and some locations represents exchange locations where drivers exchange vehicles. The new problem is called "Driver-and-Vehicle Routing Problem" and our research results are detailed in "Computers & Operations Research" 81 (2017) 247-256.
PLENARY TALK

The importance of routing at Amazon.com

Wednesday, June 5, 9:30 - 10:30 (Room Antonio Machado)
Chairman: Prof. Abraham Duarte (University Rey Juan Carlos)
Speaker: Prof. Mauricio G.C. Resende (Amazon Delivery Technologies - AmDT)

Routing plays an important role within the logistics operations at Amazon.com. In this talk we describe some routing problems that arise at Amazon. These problems are related to, for example, first mile, middle mile, and last mile ground logistics, as well as global logistics and air cargo logistics.
Implementing efficient code without dying in the effort

Tuesday, June 5, 9:00 - 9:45 (Room 1&2)
Chairman: Prof. Ana D. López-Sánchez (University Pablo de Olavide)
Speaker: Prof. Jesús Sánchez-Oro (University Rey Juan Carlos)

We all agree that the success of a research work relies on the quality of the proposed algorithm. However, many times we are so focused on the algorithmic part of our work that we forget the relevance of implementing an efficient code to solve the problem. Indeed, a bad implementation of an effective algorithm may result in a disaster, since it will not be able to outperform previous works in reasonable computing time. Therefore, it is important to dedicate an important part of the research to select the correct data structures for solution representation, for instance.

In this tutorial we will start from a direct and inefficient solution for a well-known routing problem, and we will see some tips and tricks to increase the performance of the algorithm. We will analyze the complexity of the operations performed over the selected data structures in order to reduce the time complexity of the most used operations. Finally, once we have achieved an efficient version of the algorithm, we will focus on fast and simple parallelizations for the code, with the aim of taking advantage of the multiple processors available in every computer.
Multi-Trip Vehicle Routing Problems (MTVRP) generalize the well-known VRP by allowing vehicles to perform multiple trips per day. MTVRPs have received much attention lately because of their relevance in a variety of real-life applications, in particular in city logistics and last-mile delivery. Several variants of the MTVRP have been investigated, and a number of exact algorithms have been proposed. The literature indicates that different MTVRPs can be solved with different formulations, but it seems that none of the available formulations dominates the others from a computational viewpoint. Moreover, the complexity of MTVRPs can make instances with just 25 customers challenging to solve to optimality even when resorting to dedicated mathematical formulations.

In this tutorial, we will give an overview of the MTVRP variants studied in the literature and outline the main formulations highlighting corresponding advantages and limitations, both from a theoretical and a computational viewpoint. After motivating the need for additional research on MTVRPs, we will describe a novel formulation featuring an exponential number of variables and constraints. We will also describe an exact solution framework, based on this new formulation, we have recently proposed in Paradiso et al, An Exact Solution Framework for Multi-Trip Vehicle Routing Problems with Time Windows (forthcoming in Operations Research). This solution framework allowed us to solve instances with up to 50 customers, outperforming the state-of-the-art methods for four variants of the MTVRP with Time Windows.
We notice that drivers often deviate from the sequence of stops stipulated in the routes optimized for them. This results in higher mileage than planned and often in other forms of disruption, such as missing time windows or needing to unload cargo which is not yet freely reachable in the cargo bay. The latter increases delays. The bottom line is that the savings that our solutions promise on paper do not materialize because execution deviates from the plan.

One can say that optimal is not always appealing, which in the end leads to the optimum route not being executed. To the best of our knowledge, Diego Gabriel Rossit, Daniele Vigo, Fernando Tohmé and Mariano Frutos offer in their recent paper ‘Visual attractiveness in routing problems: A review’ a breakthrough in this area. Visual attractiveness is certainly appealing to planners. But is it also appealing to drivers? How can we improve the odds that our optimized routes are driven as planned?
You are so beautiful to me, why visual attractiveness in VRPs matters and what is it anyway?

Tuesday, June 4, 9:45 - 10:30
Chairman: Prof. Wout Dullaert (Vrije Universiteit Amsterdam)
Speaker: Werner Heid (PTV Group)

Visually attractive routing plans are getting an increasing attention. Experience in practically relevant applications suggests that such solutions are preferred by managers, planners and drivers. The session will address various questions related to this observation.

- If beauty is in the eye of the beholder, how can we measure visual attractiveness objectively?
- If there is beauty in simplicity, what would simple plans and routes look like and besides, how can we obtain them?
- As minimum or near minimum-cost routing plans can look remarkably unattractive, do we even solve the right problem?
- Is beauty just an unnecessary necessity or are there practical benefits of visually attractive routes?
- Do autonomously driving vehicles still long for beautiful routes?

The questions shall help to stimulate a lively exchange and develop a deeper and more comprehensive understanding of this exciting concept.
Monday June 3rd, 2019
11:00 - 13:15

ANTONIO MACHADO  
Drone

11:00 - 11:22
› Heuristic and dynamic programming for Parallel Drone Scheduling with Multiple Drones and Vehicles  - MBIADOU SALEU Gertrude Raïssa, Laboratoire d'Informatique, de Modélisation et d'optimisation des Systèmes

11:22 - 11:44
› A prototype of truck-drone route optimization based on agent modelling and simulation  - Jose M. Leon-Blanco, Industrial Engineering and Management Science, School of Engineering, University of Seville

11:44 - 12:06
› Drone and truck deliveries: solving the parallel drone scheduling traveling salesman problem  - Roberto Montemanni, Dalle Molle Institute for Artificial Intelligence (IDSIA-USI/SUPSI)

12:06 - 12:28
› TSP with one truck and one or multiple drones  - Kilian Seifried, Business School, University of Mannheim

12:28 - 12:50
› The Mothership and Drone Routing Problem with Obstacles  - Stefan Poikonen, University of Colorado Denver Business School

12:50 - 13:12
› An Arc Routing Problem with a fleet of drones  - Isaac Plana, Universidad de Valencia

Sala 1 & 2  
Real-Life VRPs

11:00 - 11:22
› Optimisation of vessel routing for offshore wind farm maintenance tasks  - Toby Kingsman, STOR-i Centre for Doctoral Training, Lancaster University

11:22 - 11:44
› Decentralized dynamic task allocation and route planning for autonomous delivery vehicles in urban areas  - Katharina Glock, FZI Research Center for Information Technology

11:44 - 12:06
› Fleet sizing and composition in grocery retailing  - Sara Martins, INESC TEC and Faculty of Engineering, Universidade do Porto

12:06 - 12:28
› A mixed integer program for capacitated asset protection during escaped wildfire  - Delaram Pahlevani, RMIT University [Melbourne]

12:28 - 12:50
› A bilevel approach for the collaborative and integrated transportation planning  - Maria Santos, INESC TEC [Porto], Faculdade de Engenharia [Porto]

12:50 - 13:12
› The Team Orienteering Problem with Overlaps: an Application in Cash Logistics  - Wout Dullaert, Vrije Universiteit, Amsterdam

Sala 7  
City Logistics

11:00 - 11:22
› The generalized vehicle routing problem with Time Windows  - Yuan YUAN, Centre de Recherche en Informatique, Signal et Automatique de Lille (CRIStAL) - UMR 9189
11:22 - 11:44 › Vehicle Routing Problem with Flexible Drones
Ilke Bakir, University of Groningen

12:06 - 12:28 › The electric fleet transition problem
Samuel Pelletier, HEC Montréal

12:28 - 12:50 › An Exact Algorithm for a Rich Vehicle Routing Problem with Private Fleet and Common Carrier
David Lai, VU Amsterdam

12:50 - 13:12 › Dynamic Service Area Sizing for Same-Day Delivery Routing
Marlin Ulmer, Technische Universität Braunschweig

Sala 5

Exact Methods

11:00 - 11:22 › Valid Inequalities and a Branch-and-Cut Algorithm for multi-depot vehicle routing problems
Michiel Uit het Broek, Department of Operations, Faculty of Economics and Business, University of Groningen

11:22 - 11:44 › An exact algorithm for the agile earth observation satellite scheduling with time-dependent profits
Guansheng Peng, Catholic University of Leuven

11:44 - 12:06 › Decomposition approach for the distributionally robust vehicle routing problem with time window assignments
Yossiri Adulyasak, HEC Montréal

12:06 - 12:28 › The Urban Transit Network Design Problem
Alicia De Los Santos Pineda, Department of Statistics, Econometrics, Operational Research, Management Science and Applied Economics, University of Cordoba

12:28 - 12:50 › The Multi-period Multi-trip Containers Drayage Problem with Due and Release Dates
Ornella Pisacane, Dipartimento di Ingegneria dell’Informazione, Università Politecnica delle Marche

12:50 - 13:12 › Exact solution methods for the multi-period vehicle routing problem with due dates
Homero Larrain, Pontificia Universidad Católica de Chile

14:30 - 16:20

ANTONIO MACHADO

Dynamic VRPs

14:30 - 14:52 › Dynamic Time Window Reassignment
Kevin Dalmeijer, Econometric Institute, Erasmus University Rotterdam

14:52 - 15:14 › The Dynamic Orienteering Problem
Carlo Filippi, Department of Economics and Management - University of Brescia

15:14 - 15:36 › An Optimization Framework for Dynamic Multi-Skill Workforce Scheduling and Routing Problem
Onur Demiray, Koç University
Scheduling

14:30 - 14:52  Robust Crew Recovery in Air Transportation: Reserve-Crew Scheduling to Mitigate Risks
Evrim Ursavas, Department of Operations, Faculty of Economics and Business, University of Groningen

14:52 - 15:14  Heterogeneous resource scheduling and routing with order acceptance
Meryem İLBEĞİ, TOBB University of Economics and Technology [Ankara]

15:14 - 15:36  Scheduling of Intelligent and Autonomous Vehicles under pairing/unpairing collaboration strategy in container terminal: A branch-and-cut algorithm
Jorge Riera-Ledesma, Departamento de Ingeniería Informática y de Sistemas, Universidad de La Laguna

15:36 - 15:58  Supply vessel planning with uncertain demand and weather conditions
Irina Gribkovskaia, Molde University College - Specialized University in Logistics

15:58 - 16:20  Interdependent Home Health Care and Social Care Problems
Jésica de Armas, Universitat Pompeu Fabra [Barcelona]

Meta-heuristics

14:30 - 14:52  Algorithms for the Pollution Traveling Salesman Problem
Valentina Cacchiani, DEI, University of Bologna

14:52 - 15:15  Optimizing workforce scheduling and routing problem with electric vehicles
Seray Cakirgil, TOBB University of Economics and Technology

15:14 - 15:36  Optimizing Onboard Catering Loading Locations and Plans for Airlines
Seren Bilge YILMAZ, TOBB University of Economics and Technology [Ankara]

15:36 - 15:58  A Trilevel r-Interdiction Selective Multi-Depot Vehicle Routing Problem
Deniz Aksen, Koç University

15:58 - 16:20  Weekly planning in the broth and cream industry with several channels
Joaquín Pacheco, University of Burgos; José Rubén Gómez, University of Burgos

Column Generation

14:30 - 14:52  Column selection by machine learning in exact branch-and-price algorithms
Guy Desaulniers, Polytechnique Montreal and GERAD

14:52 - 15:14  A column generation approach for the driver scheduling problem with staff cars
Shyam Sundar Govindaraja Perumal, Technical University of Denmark, QAMPO ApS

15:14 - 15:36  Branch-Cut-and-Price for Scheduling Deliveries with Time Windows in a Direct Shipping Network
Timo Gschwind, Chair of Logistics Management, Gutenberg School of Management and Economics, Johannes Gutenberg University Mainz

15:36 - 15:58  Exact column generation for the electrical vehicle scheduling problem
Axel Parmentier, Centre d’Enseignement et de Recherche en Mathématiques et Calcul Scientifique
15:58 - 16:20  
Stabilized Branch-Price-and-Cut for the Commodity-constrained Split Delivery Vehicle Routing Problem  
Stefan Irnich, Chair of Logistics Management, Gutenberg School of Management and Economics, Johannes Gutenberg University Mainz

Sala 3  
TSP Variants and Green VRP

14:30 - 14:52  
New Steiner Travelling Salesman Problem Formulation and its multi-depot extension  
Jessica Rodríguez-Pereira, HEC Montréal

14:52 - 15:14  
A Skewed VNS for solving a nonlinear optimization case: The Generalized Team Orienteering Problem  
Adolfo Urrutia, Universidad Politécnica de Madrid

15:14 - 15:36  
MIPL formulations and Cutting Plane approaches for the Green Vehicle Routing Problem with Capacitated Alternative Fuel Stations.  
Maurizio Bruglieri, Dipartimento di Design, Politecnico di Milano

15:36 - 15:58  
Enhanced Multi-Directional Local Search for the Bi-Objective Heterogeneous Vehicle Routing Problem with Multiple Driving Ranges  
Majid Eskandarpour, IÉSEG School Of Management (LEM-CNRS 9221)

15:58 - 16:20  
Internalizing Negative Externalities in the Vehicle Routing Problem  
Javier Faulin, Istitute of Smart Cities, Public University of Navarra

16:40 - 18:10

ANTONIO MACHADO  
Special Session: Rich Routing and logistic (organized by GT2L)

16:40 - 17:02  
Multi-period routing and battery charge scheduling for electric vehicles  
Jorge E. Mendoza, HEC Montréal

17:02 - 17:24  
A column generation approach for the joint order batching and picker routing problem  
Maxime Ogier, Centre de Recherche en Informatique, Signal et Automatique de Lille (CRIStAL) - UMR 9189

17:24 - 17:46  
Control of Autonomous Electric Fleets for Ridehail Systems  
Nicholas Kullman, Laboratoire d'Informatique de l'Université de Tours, Centre Interuniversitaire de Recherche sur les Réseaux d'Entreprise, la Logistique et le Transport

17:46 - 18:08  
Branch-price-and-cut for the electric vehicle routing problem with stochastic travel times and battery consumption chance-constraints  
Alexandre Florio, Laboratoire d’Informatique, de Modélisation et d’Optimisation des Systèmes, Ecole des Mines de Saint-Etienne

Sala 3  
Freight Transportation

16:40 - 17:02  
Estimation of Disaggregated Freight Flows via a Real-Valued Genetic Algorithm  
Javier Rubio-Herrero, St. Mary’s University

17:02 - 17:24  
Guillaume Marques, RealOpt, Institut de Mathématiques de Bordeaux, Laboratoire de l’intégration, du matériau au système

17:24 - 17:46  
Routing in air cargo networks  
Felix Brandt, FZI Research Center for Information Technology

17:46 - 18:08  
The Vehicle Routing Problem with Private and Shared Delivery Locations
Simona Mancini, University of Cagliari

Sala 1 & 2  Real-Life VRPs
16:40 - 17:02  › Vehicle Routing Problem under Safe Distance Separation Constraints
Hyunseop Uhm, Yonsei University

17:02 - 17:24  › A Decision Support System for Attended Home Services
Bruno P. Bruck, Universidade Federal da Paraíba

17:24 - 17:46  › Asset protection problem with uncertain time of wind change
Iman Roozbeh, School of Science, RMIT University, Melbourne, Australia

17:46 - 18:08  › Multiple vehicle synchronisation in a full truck-load pickup and delivery problem: a case-study in the biomass supply chain
Ricardo Soares, Faculty of Engineering of the University of Porto, Institute for Systems and Computer Engineering, Technology and Science

Sala 7  Pickup and Delivery
16:40 - 17:02  › Solution strategies for the vehicle routing problem with backhauls
Anand Subramanian, Universidade Federal da Paraíba

17:02 - 17:24  › A New Modeling of the Transportation Constraints in the RCPSP with Routing: Application to Healthcare Problems
Marina Vinot, Laboratoire d'Informatique, de Modélisation et d'optimisation des Systèmes

17:24 - 17:46  › Optimising drayage operations by combining column generation and branch-and-cut
Robin Pearce, Vrije Universiteit Amsterdam [Amsterdam], University of Queensland [Brisbane]

17:46 - 18:08  › The pickup and delivery problem with time windows, multiple-stacks, and handling operations
Marilène Cherkesly, Université du Québec à Montréal - UQAM (CANADA), École des sciences de la gestion Université du Québec à Montréal, GERAD

Sala 5  Column Generation
16:40 - 17:02  › Route relaxations for the pickup and delivery problem with time windows
Luciano Costa, Ecole Polytechnique de Montréal and GERAD

17:02 - 17:24  › Exact method for bi-objective vehicle routing problems
Sandra Ulrich Ngueveu, Laboratoire d'analyse et d'architecture des systèmes [Toulouse]

17:24 - 17:46  › ng-Memory Based Capacity Cuts
Ymro Hoogendoorn, Econometric Institute, Erasmus University Rotterdam

17:46 - 18:08  › An exact solution method to the pollution routing problem
Magnus Stålhane, Norwegian University of Science and Technology [Trondheim]
09:00 - 09:45  Tutorial: Implementing efficient code without dying in the effort
Jesús Sánchez-Oro

09:00 - 09:45  Tutorial: Multi-Trip Vehicle Routing Problems: Variants, Formulations, and Exact Methods
Roberto Roberti

09:45 - 10:30  Brainstorming: How appealing is an optimum?
Joaquim Gromicho

09:45 - 10:30  Brainstorming: You are so beautiful to me, why visual attractiveness in VRPs matters and what is it anyway?
Werner Heid

11:00 - 11:22  The Consistent Vehicle Routing Problem for a Food Distribution Firm
Hernán Lespay, Universidad Adolfo Ibáñez [Santiago]

11:22 - 11:44  Mining frequent patterns to drive the exploration of high-order neighborhoods
Florian Arnold, University of Antwerp

11:44 - 12:06  Avoidance of unnecessary demerging and remerging logistics flows
Raymond Kwan, School of Computing, University of Leeds

12:06 - 12:28  Make it Quick: Speed-up Techniques for Solving the TSP
Maša Avakumović, Helmut Schmidt University [Hamburg]

12:28 - 12:50  Local search for the container relocation problem
Fabien Tricoire, Johannes Kepler Universität Linz

Daniele Vigo, DEI, University of Bologna

11:00 - 11:22  The effect of spatial and temporal flexibility on the profitability of one-way electric carsharing systems
Burak Boyaci, Lancaster University Management School, Centre for Transport and Logistics

11:22 - 11:44  Optimized real-time management for on-demand ride sharing services.
Zahra Ghandeharioun, Institute for Transport Planning and Systems (IVT)- ETH Zurich

11:44 - 12:06  The pickup and delivery problem with online transfers, for the next generation of public transport
Gizem Ozbaygin, Faculty of Engineering and Natural Sciences, Sabanci University

12:06 - 12:28  Handling Vehicle Relocation Through Layered graphs
Alain Quilliot, Laboratoire d'Informatique, de Modélisation et d'optimisation des Systèmes, University Clermont Auvergne

12:28 - 12:50  Comparing centralized and decentralized repositioning strategies for ride-sharing application
Martin Pouls, FZI Research Center for Information Technology

12:50 - 13:12  Predictive dynamic relocations in carsharing systems implementing complete journey reservations
Martin Repoux, Ecole Polytechnique Fédérale de Lausanne

Sala 1 & 2  Bike and Vehicle Sharing

Sala 7  City Logistics - Last Mile
A Large Neighborhood Search approach to integrate delivery options in last mile delivery
Dorian Dumez, Ecole des Mines de Nantes

Optimal vehicle routing with autonomous devices for last-mile delivery
Ivana Ljubic, ESSEC Business School

Using Mobile Pick-up Stations for Last-Mile Deliveries
Tino Henke, Otto-von-Guericke University Magdeburg

Integration of Vehicles and Drones in Last Mile Delivery
Necati Aras, Department of Industrial Engineering, Bogazici University

A Location-Routing Problem with Delivery Options and Time-Windows for the Last Mile Delivery of Fresh Products
Sonja Rohmer, Wageningen University - Operations Research and Logistics

The Last-mile Vehicle Routing Problem with Alternative Delivery Options
Christian Tilk, Chair of Logistics Management, Gutenberg School of Management and Economics, Johannes Gutenberg University Mainz

A Branch-and-Check Approach for a Tourist Trip Design Problem with Rich Constraints
Vu Duc Minh, Laboratoire d’Informatique Fondamentale et Appliquée de Tours

Improved branch-and-cut algorithm for the inventory routing problem
Jørgen Skålnes, Norwegian University of Science and Technology [Trondheim]

A Branch and-Cut Algorithm for the Distance Constrained Close-Enough Arc Routing Problem
Miguel Reula Martín, Universidad de Valencia

A Branch-and-Price Algorithm for a Vehicle Routing-allocation Problem
Mohammad Reihaneh, IÉSEG School Of Management [Paris]

Stronger bounds for the asymmetric traveling salesman problem
Safa Ben Salem, Université de Tunis, Tunis Business School, Business Analytics and Decision Making

A Periodic Multi-Vehicle Arc Routing Problem
Demetrio Laganà, Department of Mechanical, Energy and Management Engineering

The VeRoLog Solver Challenge 2019
Pim van ’t Hof, ORTEC B.V.

Using the Optaplanner solver
Raúl Martín Santamaria, Universidad Rey Juan Carlos [Madrid]

Matheuristics for the 2019 VeRoLog Solver Challenge: MIPs and Bits
Caroline Jagtenberg, University of Auckland

An Adaptive Large Variable Neighborhood Search for a Combined Vehicle Routing and Scheduling Problem
Benjamin Graf, Osnabrück University

A contribution to the VeRoLog Solver Challenge 2019
Martin Josef Geiger, Helmut-Schmidt-University, University of the Federal Armed Forces Hamburg

Optimizing the Location of Incident Response Vehicles for Congestion Mitigation
Güsta Dilaver, TOBB University of Economics and Technology [Ankara]

A Hybrid Solution Method for the Vehicle Routing Problem with Locker Boxes
Jasmin Grabenschweiger, University of Vienna

A Method for 1-M-1 Pickup and Delivery Problem with Robust Paths
Production and delivery problem with late departure and tardiness penalties

Hugo Chevroton, Laboratoire d'informatique Fondamentale et Appliquée de Tours

Home Chemotherapy Planning: An Integrated Production Scheduling and Multi-Trip Vehicle Routing Problem

Diego Cattaruzza, Centre de Recherche en Informatique, Signal et Automatique de Lille

Electric VRPs

Electric Vehicle Routing Problem with Time Windows and Stochastic Waiting Times at Recharging Stations

Merve Keskin, Warwick Business School

A Branch-and-Price Solution Approach for Electric Vehicle Routing Problems with Time Windows

Ece Naz Duman, Ece Naz Duman

Electric Arc Routing

Mario Ruthmair, University of Vienna

Benchmarking dispatching approaches for a fleet of urban autonomous delivery vehicles by solving the EVRPTW minimizing tardiness

Anne Meyer, TU Dortmund University

An Electric Vehicle Routing Problem with Flexible Time Windows

Duygu Taş, MEF University

Dial-a-Ride

Integrating the use of public transport in dial-a-ride services

Kris Braekers, Hasselt University

Integrating Dial-a-ride with Mode Choice

Xiaotong Dong, University of New South Wales [Sydney]

A Learning Large Neighborhood Search for the Dynamic Electric Autonomous Dial-A-Ride Problem

Claudia Bongiovanni, Ecole Polytechnique Federale de Lausanne (EPFL)

Exact formulation for the dial a ride problem with transfers

Jacopo Pierotti, Deft Institut of Applied Mathematics

Fair collaboration scheme for firms operating dial-a-ride services in a city network

Valentina Morandi, Freie Universität Bozen

ANTONIO MACHADO

Special Session: Rich Routing and logistic (organized by GT2L)

Multiple solve approaches applied to the Heterogeneous Vehicle Routing Problem

Gwénaël Rault, Université de Bretagne Sud, Mapotempo

A Demon Algorithm for the Vehicle Routing Problem with Cross-Docking

Gültekin Kuyzu, Zaragoza Logistics Center, TOBB University of Economics and Technology

Efficient Constraint Programming Approaches for routing problem : a case study for the VRP

Bourreau Eric, Laboratoire d'informatique de Robotique et de Microélectronique de Montpellier - philippe lacomme, Laboratoire d'informatique, de Modélisation et d'Optimisation des Systèmes, Laboratoire d'Informatique, de Modélisation et d'Optimisation des Systèmes - Gondran Matthieu, Laboratoire d'informatique, de Modélisation et d'Optimisation des Systèmes

Constraint Programming approaches for the Inventory Routing Problem

Philippe Lacomme, Laboratoire d'Informatique, de Modélisation et d'Optimisation des Systèmes
Sala 1 & 2  Real-Life VRPs

16:40 - 17:02  › Routing drones in the interior of a factory using a new version of the VRP
  Ivan derpich, Departamento de Ingeniería Industrial, Universidad de Santiago de Chile [Santiago]

17:02 - 17:24  › A Template-based ALNS for the Consistent E-VRP with Backhauls and Charging Management
  Pamela Nolz, AIT Austrian Institute of Technology

17:24 - 17:46  › A New Distribution Paradigm: Delivery of Medicines by Drone
  Tânia Ramos, Centro de Estudos de Gestão, Instituto Superior Técnico, Universidade de Lisboa

17:46 - 18:08  › A Branch-and-Price Algorithm for a Delivery Network Using Autonomous Robots
  Stefan Schaudt, Department of Transport Logistics

Sala 7  Heuristics

16:40 - 17:02  › On simple heuristics for the cumulative TSP
  Mengke WANG, Warwick Business School

17:02 - 17:24  › Optimizing routing and delivery patterns with multi-compartment vehicles
  Manuel Ostermeier, Technical University of Munich

17:24 - 17:46  › A two-stage solution approach for the directed rural postman problem with turn penalties
  Xingyin Wang, Singapore University of Technology and Design - Engineering Systems and Design

17:46 - 18:08  › A Kernel Search Heuristic for the Multi-Vehicle Inventory Routing Problem
  Gianfranco Guastaroba, Department of Economics and Management - University of Brescia

Sala 5  Supply Chain Management and Inventory Routing

16:40 - 17:02  › Sequential approaches to solve a multi-commodity transportation planning problem
  Wenjuan Gu, Centre de Recherche en Informatique, Signal et Automatique de Lille

17:02 - 17:24  › Solution Approaches for the Consistent Stochastic Inventory Routing Problem
  Emilio Jose Alarcon Ortega, University of Vienna

17:24 - 17:46  › Managing stochastic supply and demand in an inventory routing problem
  Aldair Alvarez, Federal University of São Carlos

17:46 - 18:08  › A branch-price-and-cut algorithm for the inventory routing problem with time windows
  Esra Koca, Faculty of Engineering and Natural Sciences, Sabanci University
**Wednesday, June 5th 2019**

9:30 – 10:30  **Plenary:** The importance of routing at Amazon.com - Mauricio G. C. Resende

### 11:00 - 13:15

**ANTONIO MACHADO**

**Special Session: Time-Dependent Vehicle Routing Problem**

- The Mixed Capacitated General Routing Problem with Time-Dependent Demands
  
  Chahid ahabchane, Polytechnique Montréal, Centre Interuniversitaire de Recherche sur les Réseaux d’Entreprise, la Logistique et le Transport

- The Time-Dependent Shortest Path and Vehicle Routing Problem
  
  Rabie Jaballah, Laboratoire CIRRELT Université Laval Quebec

- The Vehicle Routing Problem with Time Windows and Time-Dependent Road-Network Information
  
  Dominique Feillet, Ecole des Mines de Saint-Etienne, Laboratoire d'Informatique, de Modélisation et d'optimisation des Systèmes

- Time-dependent scheduling with replenishable resources
  
  Steffen Pottel, Kühne Logistics University - Asvin Goel, Kühne Logistics University

- Determining time-dependent minimum cost paths under several objectives
  
  Hamza Heni, Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT), Centre d’innovation en logistique et chaîne d’approvisionnement durable, Canada Research Chair in Integrated Logistics, Faculty of Business Administration, Laval University - Leandro C. Coelho, Canada Research Chair in Integrated Logistics, Faculty of Business Administration, Laval University, Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT) - Jacques Renaud, Centre d’innovation en logistique et chaîne d’approvisionnement durable, Faculty of Business Administration, Laval University, Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT)

- An enhanced lower bound for the Time-Dependent Traveling Salesman Problem
  
  Emanuela Guerriero, Università del Salento - Dipartimento di Ingegneria dell’Innovazione

**Sala 1 & 2**  **Capacitated VRP**

- An inventory routing problem with prioritized deliveries
  
  Paulina Avila, Universidad de las Américas [Puebla] - Nancy Arratia Martínez, Universidad de las Américas [Puebla]

- A metaheuristic for the inventory routing problem with divisible pickup and delivery
  
  Simen Vadseth, Norwegian University of Science and Technology [Trondheim]

- Heuristic for the dynamic scheduling of a fleet of drones for sport filming in a wide field of operations
  
  José L. Andrade-Pineda, Robotics, Vision and Control Group, Group of Robotics, Vision and Control

- A branch-and-cut algorithm for the soft-clustered vehicle routing problem
  
  Katrin Hessler, Chair of Logistics Management, Gutenberg School of Management and Economics, Johannes Gutenberg University Mainz

- Branch-cut-and-price algorithms for the vehicle routing problem with backhauls
  
  Ruslan Sadykov, Institut de Mathématiques de Bordeaux, RealOpt
A Heuristic Algorithm for the Undirected Capacitated General Routing Problem with Profits

Annarita De Maio, Department of Mechanical, Energy and Management Engineering, University of Calabria

Sala 7 Waste Management

The Cumulative Capacitated Arc Routing Problem

Sergio Andrés Lenis, Universidad EAFIT

Recyclable Waste Collection Routing Problem, formulation and solution

José Andrés Moreno Pérez, University of La Laguna, Universidad de La Laguna

Routing, scheduling and fleet composition for municipal solid waste collection: Multiple types of waste and single compartment vehicles

Dušan Hrabec, Tomas Bata University in Zlín

Waste Collection with Route Balancing Concerns: A real-world application

Ana Raquel de Aguiar, Centro de Estudos de Gestão, Instituto Superior Técnico, Universidade de Lisboa

An interactive method for multiobjective routing problems

Delgado-Antequera Laura, Departamento de Economía Aplicada (Matemáticas), Universidad de Málaga

A two - steps heuristic for a multi-objective waste collection problem

Rafael Martí, Universidad de Valencia

Sala 5 Meta-heuristics

The Clustered Heterogeneous Vehicle Routing Problem with relaxed priority rules

Tan DOAN, Laboratoire des Sciences du Numérique de Nantes

The PDP with alternative locations and overlapping time windows

Alina-Gabriela Dragomir, University of Vienna

A Large Neighborhood Search for the Active-Passive Vehicle Routing Problem

Biljana Roljic, University of Vienna, Faculty of Business, Economics and Statistics

Consistent-DARP

Samuel Vercraene, Décision et Information pour les Systèmes de Production

A new approach to solve the demand weighted vehicle routing problem

J. Manuel Colmenar, Universidad Rey Juan Carlos [Madrid]

A solution method for k-mldp and some comparatives

Julián Molina, Universidad de Málaga [Málaga]

14:30 - 16:20

ANTONIO MACHADO Meta-heuristics

A meta-heuristic approach for the Vehicle Routing Problem with occasional drivers

Raúl Martín Santamaría, Universidad Rey Juan Carlos [Madrid]

Solving order batching and picker routing, as a clustered vehicle routing problem

Babiche Aerts, University of Antwerp

The on-demand bus routing problem: the importance of bus stop assignment

Lissa Melis, University of Antwerp
15:36 - 15:58  Picking location metrics for order batching on a unidirectional cyclical picking line
Flora Hofmann, Department of Logistics [Stellenbosch]

Leandro Martins, Universitat Oberta de Catalunya - Angel Juan, Universitat Oberta de Catalunya

Sala 1 & 2  Facility Location

14:30 - 14:52  The Bi-objective p-Center and p-Dispersion problem
Sergio Pérez-Peló, Universidad Rey Juan Carlos [Madrid]

14:52 - 15:14  Criterion space search methods for a bi-objective facility location problem in the presence of uncertainty
Najmesadat Nazemi, University of Linz

15:14 - 15:36  Methods for Solving Problems in Urban Air Mobility
Eric Oden, University of Maryland - Department of Mathematics

15:36 - 15:58  The Bi-objective p-Median and p-Dispersion problem
Juan David Quintana Pérez, Universidad Rey Juan Carlos

15:58 - 16:20  Heuristics for the multi row facility layout problem considering facilities of equal length
Abraham Duarte, Universidad Rey Juan Carlos [Madrid]

Sala 7  Social Problems and other related Routing Problems

14:30 - 14:52  Setting a Maximum Capacity Network and Sharing its Cost.
Andrés Caro, Pablo de Olavide University, of Seville

14:52 - 15:14  A Dynamic Discretization approach to the integrated Service Network Design and Vehicle Routign Problem
Fabien Lehuédé, Laboratoire des Sciences du Numérique de Nantes, IMT Atlantique

15:14 - 15:36  Considering Parking Areas in Route Planning for Truck Drivers
Frank Schulz, PTV Group

15:36 - 15:58  Heuristic approach to solve a tandem truck-dron logistic delivery problem
Pedro L. Gonzalez-R, Industrial Engineering and Management Science, School of Engineering, University of Seville - David Canca Ortiz, Industrial Engineering and Management Science, School of Engineering, University of Seville

15:58 - 16:20  The tail routing problem in air transportation
Manuel Fuentes, Universidad Rey Juan Carlos [Madrid]