VeRoLog

NANTES ■ 2016

ANNUAL WORKSHOP

of the EURO working group
on Vehicle Routing
and Logistics optimization

at Mines Nantes

MINES Nantes

6-8 June 2016

verolog2016.sciencesconf.org

MINES Nantes · Université Bretagne Sud · uas: · université angers · POLYTECH TOURS · VeRoLog EURO Working Group on Vehicle Routing and Logistics Optimization · cnrs · iRCCyn · Lab-STICC · LARIS · LI Laboratoire d'Informatique EA 6300

gts systems & consulting · ORTEC OPTIMIZE YOUR WORLD · PTV GROUP the mind of movement · LocalSolver · Nantes Métropole · Région PAYS DE LA LOIRE · EURO The Association of European Operational Research Societies · Road · GdR RO CNRS – GdR 3002

CONFERENCE PROGRAM AND PRACTICAL INFORMATION

Annual workshop of the EURO working group on Vehicle Routing and Logistics optimization (VeRoLog)

Program

Nantes (France) – June 6-8, 2016

Dear VeRoLog 2016 participant,

We are very happy to welcome you in Nantes for the fifth meeting of the EURO Working Group on Vehicle Routing and Logistics optimization (VeRoLog 2016). The VeRoLog conference is an annual 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.

The program for this 5th edition is made up of 142 presentations covering a broad range of topics related to routing (e.g., dynamic vehicle routing, routing with synchronization, technician routing) and logistics (e.g. facility location, network design, supply chain management). A landmark for this edition is the notable body of research involving environmental issues (e.g. bike and vehicle sharing, electric vehicle routing, green vehicle routing and logistics). All these presentations are scheduled in five or six parallel sessions. We also have the pleasure to welcome 2 invited speakers: Stefan Røpke (Technical University of Denmark), whose talk is entitled « 10 years of Adaptive Large Neighborhood Search (ALNS) », and Mike Hewitt (Loyola University Chicago) who will present « recent advances in service network design ». As the perfect complement to the technical sessions and plenary talks, the program also includes 4 special slots devoted to more industry-oriented talks: two tutorials by LocalSolver and PTV Group and two brainstorming sessions by ORTEC and and GTS Systems. In the latter, a novelty in VeRoLog conferences, the companies will share a problem with the community and brainstorm with the participants on ways to solve it.

In addition to the scientific program, we offer a series of social events. A « Wine and cheese » evening will take place at A Cantina on the l'île Feydeau on Tuesday June 6. The gala dinner is programmed on June 7 at the restaurant L'Assise, Radisson Blu Hotel. The social program also includes a farewell event downtown Nantes on the evening of Wednesday June 8. While going from one event to the other, you will have the chance to walk through the historical centre of the city, and to discover the castle, the cathedral, the Passage Pommeraye, …

We thank all the academic and regional sponsors of VeRoLog 2016 for their generous support: Ecole des Mines de Nantes, Université d'Angers, Université de Bretagne-Sud, Polytech'Tours, IRCCyN, LARIS, Lab-STICC, LI, Nantes Métropole, Région Pays de Loire, as well as the scientific societies EURO and ROADeF. Further, we are very grateful to the companies GTS Systems & Consulting, LocalSolver, ORTEC and PTV Group for their support which attest of the interest of this conference for industry. Special thanks go also to Daniele Vigo and the VeRoLog board for their advice and guidance. Finally, we would like to extend our sincere thanks to the many people that have contributed to VeRoLog 2016.

We wish you all a pleasant conference with fruitful intellectual exchange, and a delightful stay in Nantes.

Christelle, Fabien, Jorge, Olivier, and Marc

Committees

Organizing committee

Fabien Lehuédé – General Chair

Marc Sevaux – Program Chair

Christelle Guéret – Sponsoring and funding

Jorge E. Mendoza – Webmaster

Olivier Péton – Social Program

Advisory committee

Daniele Vigo

Marielle Christiansen

Angel Corberan

Wout Dullaert

Richard Eglese

Geir Hasle

Stefan Irnich

Frederic Semet

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Administrative support

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Isabelle Lainé

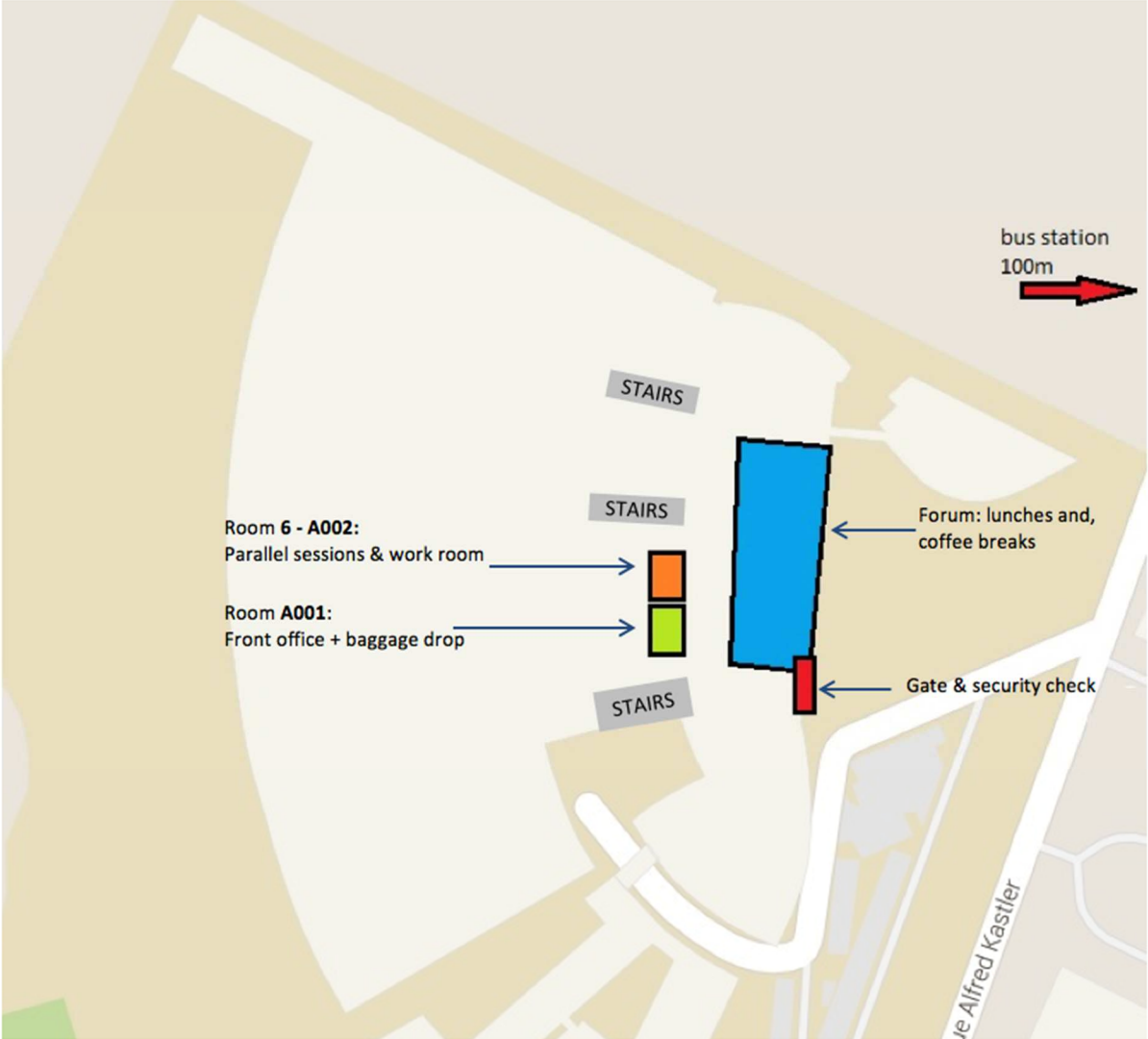Mireille Méchineau

Local committee

Kevin Barreau

Naima Belakbir

Yuan Bian

Aurélien Froger

Philippe Grangier

Axel Grimault

Alex Kosgovagan

Marion Le Garrec

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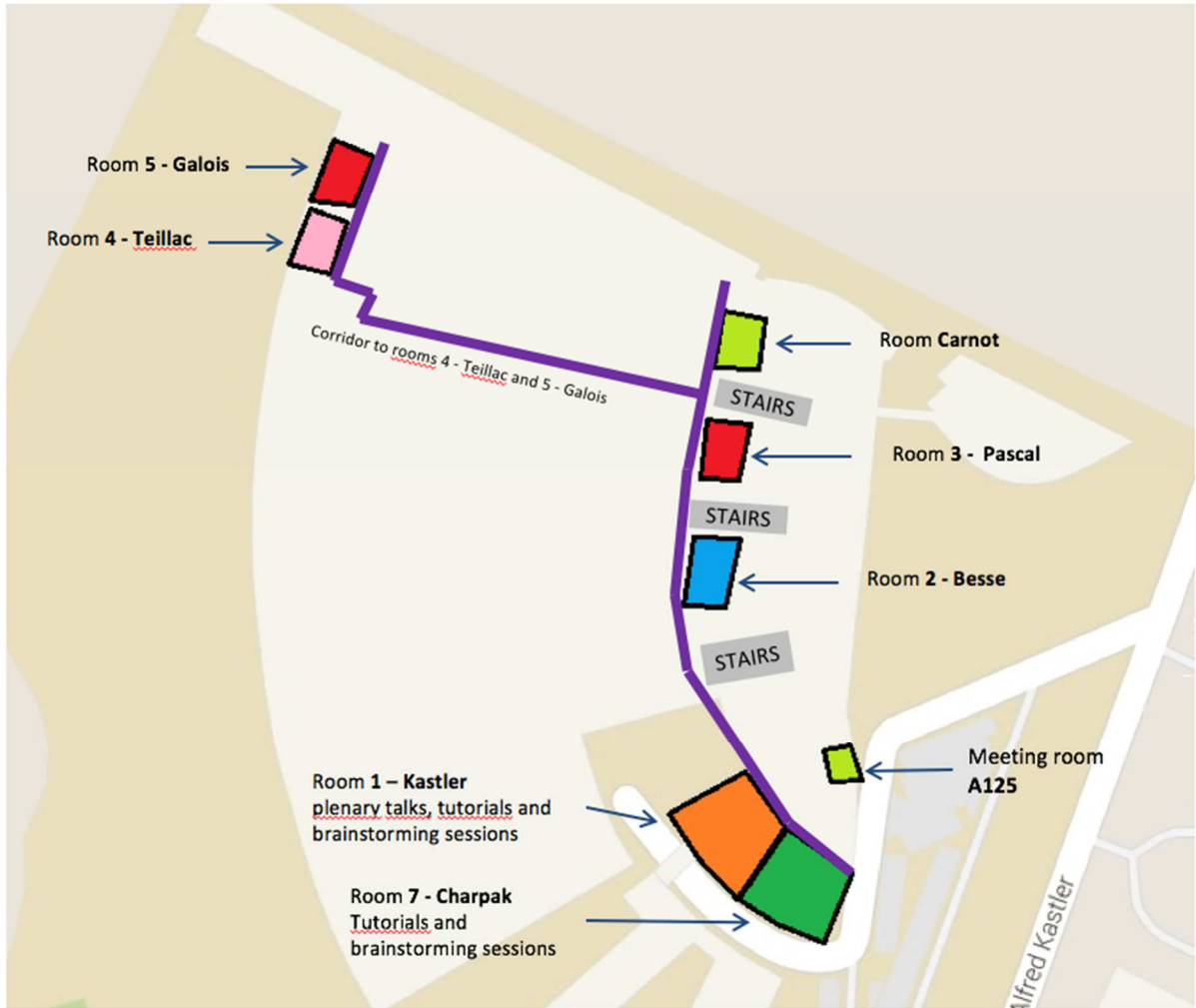
Yulong Zhao

THE VENUE

VeRoLog 2016 will be hosted at the Mines Nantes engineering school in the north of Nantes (9km away from the city center). More precisely, the campus is located at 4 Rue Alfred Kastler, 44300 Nantes (France).

The two following figures depict the conference venue.

Level 0

Level 1

Room 5 - Galois

Room 4 - Teillac

Corridor to rooms 4 - Teillac and 5 - Galois

Room Carnot

STAIRS

Room 3 - Pascal

STAIRS

Room 2 - Besse

STAIRS

Meeting room A125

Room 1 – Kastler
plenary talks, tutorials and
brainstorming sessions

Room 7 - Charpak
Tutorials and
brainstorming sessions

Alfred Kastler

BUS SCHEDULES

From downtown to Mines-Nantes

C6 — JOUR ROSE (Lundi à Vendredi) — Hermeland → Chantrerie - Grandes Écoles ♿ BUS

											(PUIS TOUTES LES 8 MIN)									
Hermeland	5.00	5.20	5.40	6.00	6.20	6.38	6.46	6.54	7.03	7.12	8.49	8.58	9.08	9.18	9.28	9.38	9.50	10.02	10.14
Dervallières	5.03	5.23	5.43	6.03	6.23	6.42	6.50	6.58	7.07	7.16	8.54	9.03	9.13	9.23	9.33	9.43	9.55	10.07	10.19
Poincaré	5.09	5.29	5.49	6.09	6.29	6.48	6.56	7.04	7.13	7.22	9.01	9.10	9.20	9.30	9.39	9.49	10.01	10.13	10.25
Mondésir	5.12	5.32	5.52	6.12	6.33	6.52	7.00	7.08	7.17	7.26	9.06	9.15	9.25	9.35	9.44	9.54	10.06	10.18	10.30
Delorme	5.14	5.34	5.54	6.14	6.36	6.55	7.03	7.11	7.20	7.29	9.09	9.18	9.28	9.38	9.47	9.57	10.09	10.21	10.33
St-Nicolas	5.15	5.35	5.55	6.15	6.38	6.57	7.05	7.13	7.22	7.31	9.11	9.20	9.30	9.40	9.49	9.59	10.11	10.23	10.35
Foch Cathédrale	5.19	5.39	5.59	6.19	6.42	7.01	7.09	7.17	7.26	7.37	9.17	9.26	9.35	9.45	9.54	10.04	10.16	10.28	10.40
Bonde	5.20	5.40	6.00	6.20	6.44	7.03	7.11	7.19	7.28	7.39	9.19	9.28	9.37	9.47	9.56	10.06	10.18	10.30	10.42
Ranzay	5.30	5.50	6.10	6.30	6.56	7.15	7.23	7.31	7.41	7.52	9.32	9.40	9.49	9.59	10.08	10.18	10.30	10.42	10.54
Beaujoire	5.32	5.52	6.12	6.33	6.59	7.18	7.26	7.35	7.45	7.56	9.36	9.44	9.53	10.03	10.12	10.22	10.34	10.46	10.58
St-Joseph de Porterie	5.36	5.56	6.16	6.37	7.03	7.22	7.30	7.40	7.50	8.01	9.41	9.49	9.58	10.08	10.17	10.27	10.39	10.51	11.03
Chantrerie	5.40	6.00	6.20	6.41	7.07	7.26	7.35	7.45	7.55	8.06	9.44	9.52	10.01	10.11	10.20	10.30	10.42	10.54	11.06

	(PUIS TOUTES LES 12 MIN)		*(PUIS TOUTES LES 12 MIN)*		*(PUIS TOUTES LES 8 MIN)*							
Hermeland	12.38	12.50	16.14	16.24	19.06	19.18	19.30	19.42	19.54	20.06	20.18
Dervallières	12.42	12.54	16.18	16.28	19.11	19.23	19.34	19.46	19.58	20.10	20.22
Poincaré	12.49	13.01	16.25	16.35	19.18	19.30	19.39	19.51	20.03	20.15	20.27
Mondésir	12.53	13.05	16.30	16.40	19.22	19.34	19.43	19.55	20.07	20.19	20.31
Delorme	12.56	13.08	16.33	16.43	19.25	19.36	19.45	19.57	20.09	20.21	20.33
St-Nicolas	12.58	13.10	16.36	16.46	19.27	19.38	19.47	19.59	20.11	20.23	20.34
Foch Cathédrale	13.04	13.16	16.42	16.52	19.33	19.43	19.52	20.04	20.16	20.28	20.38
Bonde	13.06	13.18	16.44	16.54	19.35	19.45	19.54	20.06	20.18	20.30	20.40
Ranzay	13.18	13.30	17.00	17.10	19.46	19.56	20.05	20.17	20.29	20.40	20.50
Beaujoire	13.22	13.34	17.04	17.14	19.49	19.59	20.08	20.20	20.31	20.42	20.52
St-Joseph de Porterie	13.27	13.39	17.10	17.20	19.54	20.04	20.13	20.25	20.36	20.47	20.57
Chantrerie	13.30	13.42	17.13	17.23	19.57	20.07	20.16	20.28	20.40	20.51	21.01

Hermeland	20.30	20.42	20.54	21.09	21.24	21.39	21.54	22.09	22.26	22.56	23.26	23.56	0.26
Dervallières	20.34	20.46	20.58	21.13	21.28	21.43	21.58	22.13	22.30	23.00	23.30	0.00	0.30
Poincaré	20.39	20.51	21.03	21.18	21.33	21.48	22.03	22.18	22.35	23.05	23.35	0.05	0.35
Mondésir	20.41	20.53	21.05	21.20	21.35	21.50	22.05	22.20	22.37	23.07	23.37	0.07	0.37
Delorme	20.43	20.55	21.07	21.22	21.37	21.52	22.07	22.22	22.39	23.09	23.39	0.09	0.39
St-Nicolas	20.44	20.56	21.08	21.23	21.38	21.53	22.08	22.23	22.40	23.10	23.40	0.10	0.40
Foch Cathédrale	20.48	21.00	21.12	21.27	21.42	21.57	22.12	22.27	22.44	23.14	23.44	0.14	0.44
Bonde	20.50	21.02	21.14	21.29	21.44	21.59	22.14	22.29	22.46	23.16	23.46	0.16	0.46
Ranzay	21.00	21.12	21.24	21.39	21.54	22.09	22.24	22.39	22.56	23.26	23.56	0.26	0.56
Beaujoire	21.02	21.14	21.26	21.41	21.56	22.11	22.26	22.41	22.58	23.28	23.58	0.28	0.58
St-Joseph de Porterie	21.07	21.19	21.31	21.46	22.01	22.16	22.31	22.46	23.03	23.33	0.03	0.33	1.03
Chantrerie	21.11	21.23	21.35	21.50	22.05	22.20	22.35	22.50	23.07	23.37	0.07	0.37	1.07

From Mines-Nantes to Downtown

C6 — JOUR ROSE (Lundi à Vendredi) — Chantrerie - Grandes Écoles → Hermeland ♿ BUS

									(PUIS TOUTES LES 8 MIN)		*(PUIS TOUTES LES 8 MIN)*						
Chantrerie	4.56	5.16	5.36	5.56	6.20	6.32	6.42	6.50	8.03	8.10	9.08	9.19	9.31	9.43	9.55	10.07
St-Joseph de Porterie	4.59	5.19	5.39	5.59	6.24	6.36	6.46	6.54	8.07	8.14	9.12	9.23	9.35	9.47	9.59	10.11
Beaujoire	5.03	5.23	5.43	6.04	6.29	6.41	6.51	6.59	8.13	8.20	9.17	9.28	9.40	9.52	10.04	10.16
Ranzay	5.04	5.24	5.44	6.05	6.30	6.42	6.52	7.00	8.15	8.22	9.19	9.30	9.42	9.54	10.06	10.18
Bonde	5.15	5.35	5.55	6.17	6.42	6.54	7.06	7.15	8.32	8.39	9.33	9.44	9.56	10.08	10.21	10.33
Foch Cathédrale	5.16	5.36	5.56	6.18	6.43	6.55	7.08	7.17	8.34	8.41	9.34	9.45	9.57	10.09	10.22	10.34
St-Nicolas	5.21	5.41	6.01	6.23	6.48	7.00	7.15	7.24	8.41	8.48	9.40	9.51	10.04	10.16	10.29	10.41
Delorme	5.22	5.42	6.02	6.24	6.49	7.01	7.16	7.25	8.42	8.49	9.41	9.52	10.05	10.17	10.30	10.42
Mondésir	5.23	5.43	6.04	6.26	6.51	7.03	7.18	7.27	8.44	8.51	9.43	9.54	10.06	10.18	10.31	10.43
Poincaré	5.27	5.47	6.10	6.32	6.57	7.10	7.25	7.34	8.52	8.59	9.50	10.01	10.13	10.25	10.38	10.50
Dervallières	5.33	5.53	6.16	6.38	7.03	7.16	7.31	7.40	8.59	9.05	9.56	10.07	10.19	10.31	10.44	10.56
Hermeland	5.37	5.57	6.20	6.42	7.10	7.23	7.38	7.47	9.05	9.11	10.02	10.13	10.25	10.37	10.50	11.02

	(PUIS TOUTES LES 12 MIN)		*(PUIS TOUTES LES 12 MIN)*			*(PUIS TOUTES LES 8 MIN)*					
Chantrerie	12.31	12.43	15.43	15.53	16.01	18.33	18.44	18.56	19.08	19.20	19.32
St-Joseph de Porterie	12.35	12.47	15.47	15.57	16.05	18.37	18.48	19.00	19.12	19.24	19.36
Beaujoire	12.40	12.52	15.53	16.03	16.11	18.42	18.53	19.05	19.17	19.29	19.41
Ranzay	12.42	12.54	15.55	16.05	16.13	18.44	18.55	19.07	19.19	19.31	19.42
Bonde	12.57	13.09	16.10	16.20	16.28	18.58	19.09	19.21	19.33	19.43	19.54
Foch Cathédrale	12.58	13.10	16.12	16.22	16.30	18.59	19.10	19.22	19.34	19.44	19.55
St-Nicolas	13.05	13.17	16.19	16.29	16.37	19.06	19.17	19.29	19.41	19.51	20.02
Delorme	13.06	13.18	16.20	16.30	16.38	19.07	19.18	19.30	19.42	19.52	20.03
Mondésir	13.07	13.19	16.22	16.32	16.40	19.09	19.20	19.31	19.43	19.53	20.04
Poincaré	13.14	13.26	16.29	16.41	16.49	19.17	19.28	19.37	19.49	19.59	20.10
Dervallières	13.20	13.32	16.35	16.47	16.55	19.23	19.34	19.43	19.55	20.05	20.16
Hermeland	13.26	13.38	16.41	16.53	17.01	19.29	19.40	19.49	20.01	20.11	20.22

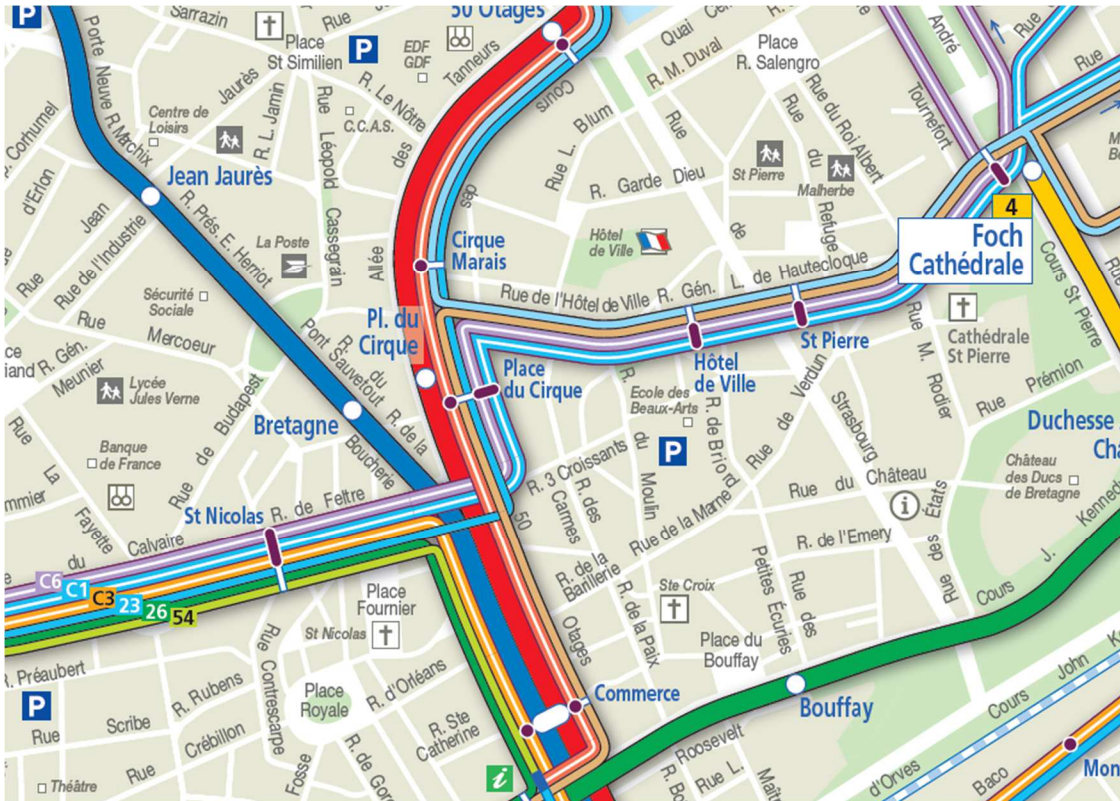| Chantrerie	19.44	19.56	20.08	20.20	20.32	20.44	20.56	21.08	21.20	21.33	21.48	22.03	22.18	22.48	23.18	23.48	0.18
St-Joseph de Porterie	19.48	20.00	20.12	20.24	20.36	20.48	21.00	21.12	21.24	21.37	21.52	22.07	22.22	22.52	23.22	23.52	0.22
Beaujoire	19.53	20.05	20.17	20.29	20.40	20.52	21.04	21.16	21.28	21.41	21.56	22.11	22.26	22.56	23.26	23.56	0.26
Ranzay	19.54	20.06	20.18	20.30	20.41	20.53	21.05	21.17	21.29	21.42	21.57	22.12	22.27	22.57	23.27	23.57	0.27
Bonde	20.06	20.18	20.30	20.42	20.53	21.05	21.17	21.29	21.41	21.54	22.09	22.23	22.38	23.08	23.38	0.08	0.38
Foch Cathédrale	20.07	20.19	20.31	20.43	20.54	21.06	21.18	21.30	21.42	21.55	22.10	22.24	22.39	23.09	23.39	0.09	0.39
St-Nicolas	20.14	20.26	20.37	20.49	21.00	21.12	21.24	21.36	21.48	22.01	22.16	22.29	22.44	23.14	23.44	0.14	0.44
Delorme	20.15	20.27	20.38	20.50	21.01	21.13	21.25	21.37	21.49	22.02	22.17	22.30	22.45	23.15	23.45	0.15	0.45
Mondésir	20.16	20.28	20.39	20.51	21.02	21.14	21.26	21.38	21.50	22.03	22.18	22.31	22.46	23.16	23.46	0.16	0.46
Poincaré	20.22	20.33	20.43	20.55	21.06	21.18	21.30	21.42	21.54	22.07	22.23	22.36	22.51	23.21	23.51	0.21	0.51
Dervallières	20.28	20.39	20.49	21.01	21.12	21.24	21.36	21.48	22.00	22.13	22.29	22.42	22.57	23.27	23.57	0.27	0.57
Hermeland	20.34	20.44	20.54	21.06	21.17	21.29	21.41	21.53	22.05	22.17	22.34	22.47	23.02	23.32	0.02	0.32	1.02

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Main bus stops in the city center (line C6 is the fastest way to get to Mines Nantes)

SOCIAL PROGRAM

Sunday 5
Informal get together
Starting 6:00pm – Le lieu unique (2 Quai Ferdinand Favre)
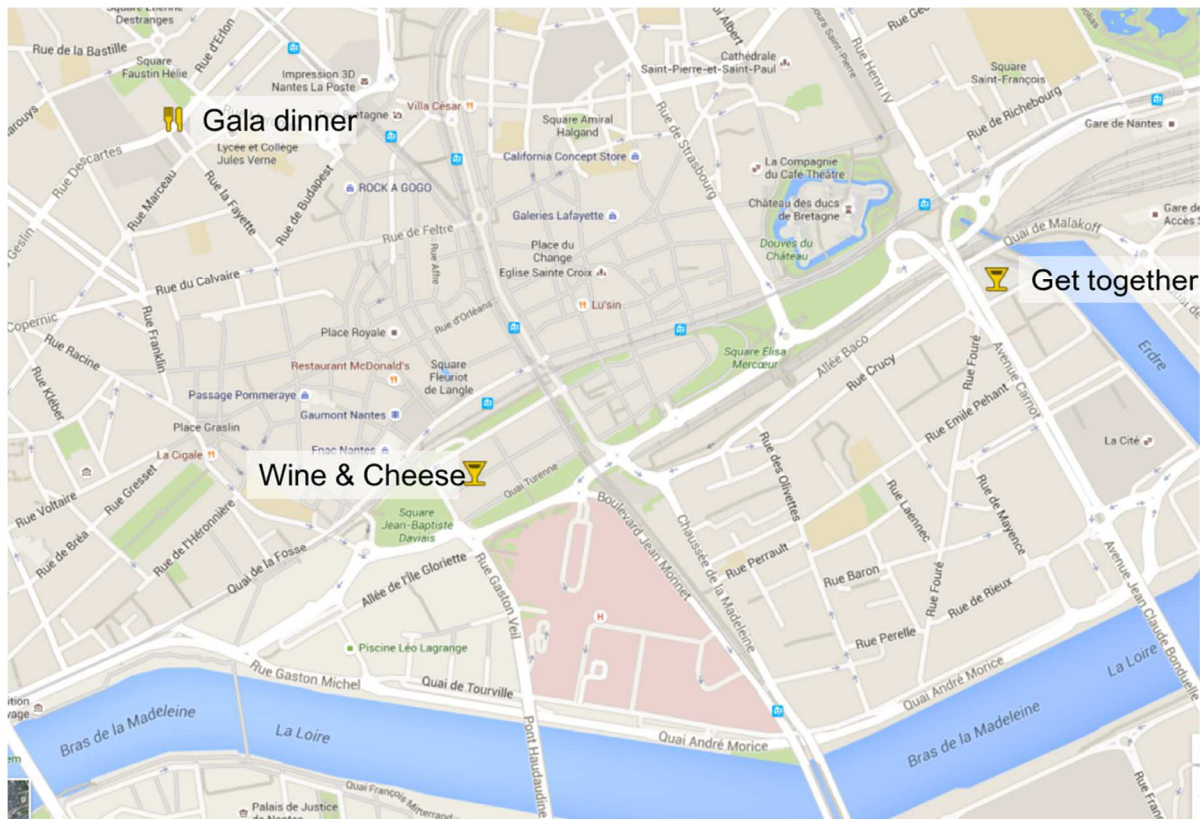
Monday 6
Wine & Cheese
7:00pm - A Cantina (28 Rue Kervégan)

Tuesday 7
Gala Dinner
7:30pm - Restaurant l'Assise
Radison Blu hotel (6 Place Aristide Briand)

PROGRAM OVERVIEW

	Mon. 06	Tue. 07	Wed. 08
08:00			
	Registration *(Forum)*		
09:00	**Welcome session** *(Kastler)*	**Plenary session** Recent advances in service network design Michael Hewitt *(Kastler)*	WA1: Bike and vehicle sharing *(Kastler)* WA2: Collaborative transp. and logistics *(Besse)* WA3: Routing with synchronization *(Pascal)* WA4: Shortest path problems *(Teillac)* WA5: Technician routing *(Galois)* WA6: Green vehicle routing and logistics *(A002)*
10:00	**Plenary session** 10 years of Adaptive Large Neighborhood Search (ALNS) Stefan Ropke *(Kastler)*		
		Coffee break *(Forum)*	Coffee break *(Forum)*
11:00	Coffee break *(Forum)*	TA1: Exact methods *(Kastler)* TA2: Vehicle routing with time windows *(Besse)* TA3: City Logistics *(Pascal)* TA4: Inventory routing *(Teillac)* TA5: Pickup and delivery *(Galois)*	WB1: Freight transportation *(Kastler)* WB2: Multi-objective VRPs *(Besse)* WB3: Ports and logistics *(Pascal)* WB4: Inventory routing *(Teillac)* WB5: Rich VRP *(Galois)* WB6: Meta-heuristics *(A002)*
12:00	MA1: Real road networks *(Kastler)* MA2: Railway applications and others *(Besse)* MA3: Freight transportation *(Pascal)* MA4: Inventory routing *(Teillac)* MA5: Waste management *(Galois)* MA6: Heuristics *(A002)*		
13:00	Lunch	Lunch	Lunch
14:00	**Tutorial:** Solving routing and scheduling problems using LocalSolver *(Kastler)* **Brainstorming:** When is a route really feasible in practice? (Charpak)	**Tutorial:** PTV xServer *(Charpak)* **Brainstorming:** The VRP with rhythms *(Kastler)*	WC1: CVRP *(Kastler)* WC2: Exact methods *(Besse)* WC3: Routing with synchronization *(Pascal)* WC4: Vehicle routing with time windows *(Teillac)* WC5: Stochastic vehicle routing *(Galois)*
15:00	MB1: Stochastic vehicle routing *(Kastler)* MB2: Maritime transportation *(Besse)* MB3: Bike and vehicle sharing *(Pascal)* MB4: City Logistics *(Teillac)* MB5: Split deliveries *(Galois)*	TB1: Dial-a-Ride *(Kastler)* TB2: Healthcare logistics *(Besse)* TB3: TSP variants *(Pascal)* TB4: Green vehicle routing and logistics *(Teillac)* TB5: Facility Location *(Galois)*	
16:00	Coffee break *(Forum)*	Coffee break *(Forum)*	**VeRoLog Closing session** *(Kastler)*
17:00	MC1: Rich VRP *(Kastler)* MC2: City Logistics *(Besse)* MC3: Supply chain management *(Pascal)* MC4: Inventory routing *(Teillac)* MC5: Facility Location *(Galois)*	TC1: Rich VRP *(Kastler)* TC2: Dynamic vehicle routing *(Besse)* TC3: Maritime transportation *(Pascal)* TC4: Column generation/branch&price *(Teillac)* TC5: Facility Location *(Galois)*	

PLENARY TALKS

10 years of Adaptive Large Neighborhood Search (ALNS)

Dr. Stefan Ropke
Technical University of Denmark
Monday June 6
9:45am
Room: 1 - Kastler

It is a decade ago since the first paper describing the Adaptive Large Neighborhood Search (ALNS) was published. Since then the heuristic has been applied to a multitude of vehicle routing problems and it has often been shown to produce competitive results. A potential reason for the popularity of the heuristic is that it is easy to incorporate new constraints and/or changes to the objective function and that it requires relatively little tuning in order for the heuristic to produce satisfactory results. These properties make the heuristic especially well-suited for handling real-life problems.

The ALNS is based on the metaheuristics Large Neighborhood Search and Ruin-and-Recreate. These heuristics move from solution to solution by repeatedly destroying part of the solution and afterwards repairing the solution again. The Adaptive Large Neighborhood Search (ALNS) heuristic extends the aforementioned heuristics by utilizing a portfolio of algorithms for both destroying and repairing a solution. The heuristic keeps track of the impact of the destroy/repair methods and favor methods that has been successful in the previous iterations. The reasoning behind this is to let the heuristic adapt to the instance at hand and to the current state of the search.

The talk will review the basic ideas behind the heuristic as well as the origins of it. We will look at the development that has taken place since the first papers describing the heuristic, including applications of the heuristic. From this we will derive information about the most important components of the heuristic and provide rules of thumb for key decisions encountered when implementing the heuristic for a new problem. Finally, we will attempt to outline potential future research topics related to the adaptive large neighborhood search heuristic.

Recent advances in service network design

Dr. Michael Hewitt
Loyola University Chicago (USA)
Tuesday, June 7
9:15am
Room: 1 - Kastler

Consolidation carriers transport customer shipments that are small relative to container capacity and have enabled, amongst other things, the transformative effects of eCommerce. They typically participate in one of two industries: (1) less-than-truckload (LTL) freight, a roughly $30 billion industry in the United States, and, (2) small package/parcel, a much larger industry with one player alone (UPS) reporting $54 billion in revenue in 2012. Both LTL and small package carriers play a prominent role in the fulfillment of orders placed online, in brick-and-mortar stores, and through other channels. Fast shipping times and low costs are critical to the success of retailers that compete in a global marketplace; a survey by Pitney-Bowes reported that 49% of shoppers abandoned a purchase due to shipping costs. For a consolidation carrier to deliver goods in a cost-effective manner they must consolidate shipments, which in turn requires planning paths for different shipments that coordinate in both space and time. The processes that plan these paths have long been assisted by solving the Service Network Design problem, which prescribes the choice of paths for shipments and the services or resources necessary to execute them.

Advances in computational power have enabled researches to develop new, more complex, service network design models. Some of these new models seek to more accurately represent the operational landscape of a consolidation carrier. For example, while the earliest service network design models did not consider the time dimension at all, current research efforts are modeling time to the hour. Similarly, the initial service network design models assumed model parameter values were known with certainty a priori. Yet now much research is being done to solve models that recognize uncertainty in various parameter values (particularly demands and capacities).

Other advances seek to extend the scope of decisions prescribed by service network design models. For example, researchers are working on service network design models that can also inform strategic decisions such as fleet/resource acquisition and allocation. Other models also negotiate pick-up and drop-off time windows with customers. Finally, researchers are working on models that recognize new transportation infrastructures such as those prescribed by the Physical Internet Initiative. In this talk I will review these new models as well as the solution approaches developed to handle the added complexities. Finally, I will propose what I believe to be the next generation of models that the research community should develop and solve.

TUTORIALS

Solving routing and scheduling problems using LocalSolver
Thierry Benoist - Innovation 24 & LocalSolver
Monday, June 6 - 2:00pm
Room: 1 - Kastler

LocalSolver is a heuristic solver for large-scale optimization problems. Having modeled your optimization problem using common mathematical operators, LocalSolver provides you with high-quality solutions in short running times. Combining different optimization techniques, LocalSolver scales up to millions of variables, running on basic computers.

One of the strengths of LocalSolver is its rich yet simple modeling framework. Indeed, most usual mathematical operators are available, including arithmetical expressions (sum, product, trigonometric functions) or logical expressions (comparisons, conditional terms, array indexing). As a consequence, there is no need to linearize the considered problem: the user can model it directly and naturally.

Initially this modeling power was based on numerical decision variables only (binary, integer or continuous). A significant extension to this approach was brought in 2015 with the introduction of high level decision variables, inspired from Constraint Programming Set-Based Variables. Many optimization problems involve sequencing or ordering concepts: scheduling, routing, network design. For these problems, a new type of variables yields even simpler and more compact models. The value of such a variable is not a number but a collection of numbers. More precisely, a list variable list(n) represents a sub-permutation of the set {0,1,2,….n-1}. We will show in this presentation how this new kind of variables allows building very simple and very effective models for a number of optimization problems, including routing and scheduling problems.

PTV xServer – developer components for logistical and geographical functions
Stefan Hug, Sébastien Beolet – PTV Group
Tuesday, June 7 – 2:00pm
Room: 1 - Kastler

PTV xServer comprises different developer components that offer a broad range of useful logistical and geographical optimization functions. Among others the scope covers trip optimization, field force management, loading space optimization or territory design as well as shortest-path calculation, geocoding and map rendering.
The interactive tutorial session will show how easily PTV xServer can be integrated in existing systems and applications to provide basic planning functionality in order to tackle successfully real world problems in the field of transportation logistics. During the session the participants can instantly use PTV xServer and experiment with concrete samples directly on their devices. We will focus on 2 different use-cases. First we present how to calculate the best ETA (Estimated Time of Arrival) for a route. Different featurelayer1 themes representing truck

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[1] for details on feature layer technology we refer to the talk of Yann Bartesch and Sébastien Beolet *Generic and scalable annotation layers for shortest path road networks,* also at VeRoLog 2016

attributes (e.g. vehicle dimensions and weights) or traffic incidents are taken into account. Furthermore we illustrate how these data sources can be visualized on a map. We also show how further values, like emission calculation or exact toll price reports can be added to the results.

The second use-case concentrates on advanced route planning. Here we demonstrate possibilities to solve various vehicle routing problems.

PTV will provide a free academic license for PTV xServer. Further details will be given in the session.

BRAINSTORMINGS SESSIONS

When is a route really feasible in practice?
Bas den Heijer and Gerhard Post - ORTEC
Monday, June 6 - 2:00pm
Room: 7- Charpak

Optimizing the order of stops in a vehicle route can be challenging enough assuming an easy check for the feasibility of a given route. However, in practice, the conditions that customers and legislation can impose on a route are diverse and mostly very tricky. The basic scientific conditions: time windows for tasks (1), total capacity of the truck (2), and maximum duration of the route (3) all have variants that are highly non-trivial:

1. Consider the best known solutions of the 300 VRPTW benchmarks by Gehring and Homberger. Very small increases of the travel time estimates render all 300 solutions infeasible. Hence a customer requesting robust routes will find these solutions unacceptable.
2. Instead of 1-dimensional loading, the vehicle can have compartments or the loading itself can be a 3-dimensional packing problem.
3. Rules of driving hours, breaks, and rest give additional restrictions on a route, which can depend on the driver driving it.

How to incorporate these conditions while running a routing algorithm is not obvious. We invite the audience to express their opinions on these.

The VRP with Rhythms
Tore Grünert - GTS Systems and Consulting
Tuesday, June 7 – 2:00pm
Room: 7 - Charpak

In this workshop I would like to present and discuss an interesting variant of the vehicle routing problem (VRP) that is often encountered in practice. In the VRP with rhythms (VRPR), we are given a number of periods and a number of orders. Each order has a rhythm that specifies the number of periods between two visits. For example, if the rhythm is one, the order has to be executed every period, if it is two, it has to be executed every other period etc. If we take all rhythms into account, the least common multiple (lcm) of all rhythms determines the planning horizon, i.e. the time after which the execution of the orders will repeat. For example, if we

have orders with rhythms 1, 2, 3 and 4, the lcm is 12, meaning that any rhythmic pattern will repeat after 12 periods. For each order the decision maker can decide about the starting period of the order. For example, if the order has a rhythm of 4 and the starting period is 3, the active periods are 3, 7, 11 etc. Using these starting periods, the active orders are known for each period of the planning horizon.

The task of the VRPR is thus to allocate each order to one route, choose a starting period for the order and to sequence the orders within a 'master' route so that the routes that contain the active orders of the period are feasible and cost-optimal over the entire planning horizon. Depending on the application context, the routes usually have to fulfil typical constraints of a VRP, like time windows and capacity constraints. In addition, it is usually required that the workload (capacity utilisation, distance, total route duration) is balanced over the periods.

Very often, the orders have a probability in addition to a rhythm. This means that the customer decides shortly before execution whether the order needs to be executed or not. Note that the VRPR assumes that the allocation to the vehicle and the sequence of the orders in the master route is fixed.

The VRP with rhythms occurs regularly in the waste industry, where different types of waste have different rhythms. Another application area is the planning of service or sales staff. Here, different types of customers may have different service or visitation intervals.

TECHNICAL SESSIONS

Program modifications:

 Despite our best effort, the program may change during the conference due to last-minute cancelations or travel issues. The modifications to the program will be announced every morning. You can also access the modifications online at: http://verolog2016.sciencesconf.org or simply scan the QR code on the left on your smart phone.

Guidelines for session chairs

The role of the Chair is to coordinate the smooth running of the session. The Chair:

- Begins and ends the session on time. Time per presentation is determined by the number of papers in the session. Equal time should be given to each paper.
- Introduces each presentation (just the title of the paper and the name of the presenting author).
- Ensures that presentations are made in the order shown in the program. This allows for "session jumping." If a speaker cancels or does not attend, the original time schedule should be adhered to rather than shifting every talk forward.

Monday - 06/06

11:30 - 12:45

MA1 - Real road networks
Room: 1 - Kastler
Chair: Marc Sevaux

11:30 **Web services for routing problems**
Sevaux Marc, Bomel Pierre

11:55 **Solving the time-and-load dependent green vehicle routing and scheduling problem on real road networks**
Raeesi Ramin, Zografos Konstantinos

12:20 **Modelling Vehicle Routing Problems in Real Road Networks**
Ben Ticha Hamza, Absi Nabil, Feillet Dominique, Quilliot Alain

MA2 - Railway applications and others
Room: 2 - Besse
Chair: Paolo Toth

11:30 **The Timetable Planning Problem for the High Speed Trains of the Chinese Railways**
Cacchiani Valentina, Jiang Feng, Toth Paolo

11:55 **A Branch-and-Bound for Speed Optimization in Pickup and Delivery Problem under Track Contention**
Adamo Tommaso, Bektas Tolga, Ghiani Gianpaolo, Guerriero Emanuela, Manni Emanuele

12:20 **A Dynamic Programming Approach for Optimizing Train Speed Profiles**
Haahr Jørgen, Pisinger David, Sabbaghian Mohammad

MA3 - Freight transportation
Room: 3 - Pascal
Chair: Luigi De Giovanni

11:30 **A column generation approach for multi modal operational transportation planning**
Wolfinger David, Tricoire Fabien, Doerner Karl

11:55 **A Multi-Resource Routing Problem: Container Delivery in Urban Area**
Ritzinger Ulrike, Hu Bin, Sibincic Aleksandar

12:20 **A rich vehicle routing problem in express freight transportation**
De Giovanni Luigi, Gastaldon Nicola, Sottovia Filippo

MA4 - Inventory routing
Room: 4 - Teillac
Chair: Claudia Archetti

11:30 **Minimizing the logistic ratio in the inventory routing problem**
Archetti Claudia, Desaulniers Guy, Speranza M. Grazia

11:55 A Column Generation Framework for Industrial Gas Inventory Routing

Fokouop Rodrigue, André Jean, Traversi Emiliano, Wolfler Calvo Roberto, Létocart Lucas, Baldacci Roberto

12:20 A Hybrid Local Search Algorithm for Production Routing Problem

Avci Mustafa, Topaloglu Seyda

MA5 - Waste management
Room: 5 - Galois
Chair: Iliya Markov

11:30 The Waste Collection Vehicle Routing Problem with Time Windows and uncertain demands: Model and solution approaches

Tonneau Quentin, Bostel Nathalie, Dejax Pierre, Yeung Thomas

11:55 Waste collection inventory routing with non-stationary stochastic demands

Markov Iliya, Maknoon Yousef, Cordeau Jean-François, Varone Sacha, Bierlaire Michel

MA6 - Heuristics
Room: 6 - A002
Chair: Renata Mansini

11:30 Large Neighborhood Search for the Clustered Vehicle Routing Problem

Hintsch Timo, Irnich Stefan

11:55 Heuristic Solutions for a Bicriteria Evacuation Scheduling and Transportation Problem

Deghdak Kaouthar, T'kindt Vincent

12:20 The Directed Profitable Rural Postman Problem with Incompatibility Constraints

Mansini Renata, Colombi Marco, Corberán Angel, Plana Isaac, Sanchis José Maria

14:45 - 16:00

MB1 - Stochastic vehicle routing
Room: 1 - Kastler
Chair: Carlo Filippi

14:45 The Stochastic Multi-period Time Windows Assignment Problem

Côté Jean-François, Raffaele Alice, Mansini Renata

15:10 The probabilistic orienteering problem

Angelelli Enrico, Archetti Claudia, Filippi Carlo, Vindigni Michele

MB2 - Maritime transportation
Room: 2 - Besse
Chair: Xin Wang

14:45 In-port routing and scheduling with stochastic travel times in chemical shipping

Skogen Eline, Elgesem Aurora, Wang Xin, Fagerholt Kjetil

15:10 **A Metaheuristic Approach to Fisheries Survey Route Planning**

Paias Ana, Mesquita Marta, Wise Laura

MB3 - Bike and vehicle sharing
Room: 3 - Pascal
Chair: Ornella Pisacane

14:45 **A multi-objective optimization for relocating electric vehicles in car-sharing services**

Pisacane Ornella, Bruglieri Maurizio, Pezzella Ferdinando

15:10 **Setting Inventory Levels in a Bike Sharing Network**

Datner Sharon, Raviv Tal, Tzur Michal, Chemla Daniel

15:35 **On finding optimal charging station locations in an electric car sharing system**

Brandstätter Georg, Leitner Markus, Ljubic Ivana

MB4 - City Logistics
Room: 4 - Teillac
Chair: Patrick-Oliver Groß

14:45 **Strategic Fleet Planning for City Logistics**

Franceschetti Anna, Honhon Dorothée, Laporte Gilbert, Van Woensel Tom, Fransoo Jan

15:10 **A simple LNS-based heuristic for Two-Echelon Routing Problems**

Breunig Ulrich, Schmid Verena, Hartl Richard , Vidal Thibaut

15:35 **Interval Travel Times for Reliable City Logistics Vehicle Routing**

Groß Patrick-Oliver, Ulmer Marlin, Mattfeld Dirk

MB5 - Split deliveries
Room: 5 - Galois
Chair: Martin Josef Geiger

14:45 **Some ideas and tests of neighborhoods for the split delivery vehicle routing problem**

Geiger Martin Josef, Sevaux Marc

15:10 **Methods for solving multiple depots split deliveries vehicle routing problems**

Santos Andréa Cynthia

16:30 - 17:45

MC1 - Rich VRP
Room: 1 - Kastler
Chair: Florian Arnold

16:30 **Fleet size and mix split-delivery vehicle routing: a study of MIP formulations**

Maheo Arthur, Urli Tommaso , Kilby Philip

16:55 **A general and scalable fleet design approach for rich vehicle routing problems**

Bertoli Francesco, Kilby Philip, Urli Tommaso

17:20 **The multi-product multi-depot vehicle routing problem with inventory restrictions**

Arnold Florian, Sörensen Kenneth

MC2 - City Logistics
Room: 2 - Besse
Chair: Franziska Heinicke

16:30 **From Floating Car Data to Time-Dependent Route Scheduling: a Holistic Methodology**

Heinicke Franziska, Simroth Axel

16:55 **Anticipation of Stochastic Travel Times Matrices Changes for Dynamic Vehicle Routing Induced by Emission-Driven Traffic Management**
Köster Felix, Ulmer Marlin, Mattfeld Dirk, Hasle Geir

17:20 **Time uncertainties in a city distribution scheme with synchronization**

Anderluh Alexandra, Larsen Rune

MC3 - Supply chain management
Room: 3 - Pascal
Chair: Thierry Benoist

16:30 **A compact linear programming model to supply a local bioraffinery**

Ba Birome Holo, Prins Christian, Prodhon Caroline

16:55 **Closed-loop Supply Chain Network Design under Demand and Return Uncertainty**

Uster Halit, Hwang Sung

17:20 **Designing and optimizing an LNG supply chain using LocalSolver**

Benoist Thierry, Gardi Frederic, Megel Romain, Pajean Clément, Ben Belgacem Michel, Leblanc Delphine, Legrand Frédéric, Pietrasz Slawomir

MC4 - Inventory routing
Room: 4 - Teillac
Chair: Jose Walteros

16:30 **A Mathematical Programming Framework that Integrates Customer Decisions within the Distribution Planning of Petroleum Products**
Hsu Yan, Walteros Jose, Batta Rajan

16:55 **Lower bound on the logistic ratio objective function for bulk distribution inventory-routing problem**

Jovanovic Tamara, Vasquez Michel, Giroudeau Rodolphe

MC5 - Facility Location
Room: 5 - Galois
Chair: David Cortés Murcia

16:30 **Mixed integer formulations for the Green Location Routing Problem**

Cortés-Murcia David, Guerrero William J., Montoya-Torres Jairo R.

16:55 **An Integrated Location-Inventory-Routing Problem**

Amiri-Aref Mehdi, Klibi Walid, Babai Zied

Tuesday - 07/06

11:00 - 12:40

TA1 - Exact methods
Room: 1 - Kastler
Chair: Jens Lysgaard

11:00 **A Matheuristic for the MinMax Capacitated Open Vehicle Routing Problem**

Lysgaard Jens, López-Sánchez Ana Dolores, Hernández-Díaz Alfredo García

11:25 **A branch and cut for the Hierarchical Mixed Rural Postman Problem**

Corberán Angel

11:50 **A Branch & Cut algorithm for the Multi-trip Vehicle Routing Problem with Time Windows**

Cattaruzza Diego, Gianessi Paolo

TA2 - Vehicle routing with time windows
Room: 2 - Besse
Chair: Jeroen Corstjens

11:00 **A real-world routing and scheduling problem of employees with different skills in multiple working locations**

Dragomir Alina-Gabriela, Nolz Pamela, Ritzinger Ulrike, Doerner Karl

11:25 Unpredictability and inconsistency - routing in the domain of security services

Salzmann Philipp, Schilde Michael , Doerner Karl

11:50 **Analysing metaheuristic algorithms for the vehicle routing problem with time windows**

Corstjens Jeroen, Caris An, Depaire Benoît, Sörensen Kenneth

TA3 - City Logistics
Room: 3 - Pascal
Chair: Jan Fabian Ehmke

11:00 **Impact of a Mixed Fleet on Urban Emissions Routing**

Ehmke Jan Fabian, Campbell Ann, Thomas Barrett

11:25 **Goods Distribution with Electric Vehicles: Integrating Battery Behaviour into Routing**

Pelletier Samuel, Laporte Gilbert, Jabali Ola

11:50 **The impact of depot location, fleet composition and routing on emissions in city logistics**

Koç Cagri, Bektas Tolga, Jabali Ola, Laporte Gilbert

12:15 **Using tricycles for express deliveries of urgent grocery needs**

Schwarzbach Stefan, Nolz Pamela, Ritzinger Ulrike, Hu Bin

TA4 - Inventory routing
Room: 4 - Teillac
Chair: Erdal Aydemir

11:00 **Inventory Routing Problem over the long term: a math-heuristic approach**

Absi Nabil, Cattaruzza Diego, Feillet Dominique, Ogier Maxime, Semet Frederic

11:25 **Tackling a large production-routing problem in the meat stores of a hypermarket chain**

Neves-Moreira Fábio, Guimarães Luís, Almada-Lobo Bernardo, Jans Raf, Cordeau J.-F.

11:50 **Tactical Supply Chain Distribution Planning In The Telecommunications Service Industry**

Desport Pierre, Lardeux Frédéric, Lesaint David, Di Cairano-Gilfedder Carla

12:15 **Smooth Operations in Rugged Supply Chains - Balancing Operations for the Inventory Routing Problem**

Aydemir Erdal, Geiger Martin Josef, Huber Sandra

TA5 - Pickup and delivery
Room: 5 - Galois
Chair: Gerhard Post

11:00 **The Third VeRoLog Solver Challenge**

Post Gerhard, Den Heijer Bas

11:25 **Horizontal Cooperation in Dial-a-Ride Services**

Molenbruch Yves, Braekers Kri, Caris An

11:50 **Two cluster-based approaches for the Pick-up and Delivery Problem with Time Windows**

Al Chami Zaher, Manier Hervé, Manier Marie-Ange, Khalil Mohamad

12:15 **Location-allocation and load assignment problem for a package delivery company**

Restrepo Maria I., Semet Frederic, Pocreau Thomas

14:45 - 16:00

TB1 - Dial-a-Ride
Room: 1 - Kastler
Chair: Kris Braekers

14:45 **An Adaptive Large Neighborhood Search for the Dial-a-Ride Problem**

Gschwind Timo, Drexl Michael

15:10 **The heterogeneous dial-a-ride problem with reconfigurable vehicle capacity**

Tellez Oscar, Vercraene Samuel, Lehuédé Fabien, Thibaud Monteiro, Péton Olivier

15:35 **A multi-period dial-a-ride problem with driver consistency**

Braekers Kris, Kovacs Attila

TB2 - Healthcare logistics
Room: 2 - Besse
Chair: Daniele Manerba

14:45 **Biosolver: a VRPTW solver for the nurses tour scheduling problem with hard time constraints**

Chrétien Stéphane, Coupey Julien, Nicod Jean-Marc, Varnier Christophe

15:10 **A Nurse Routing Problem with operational side-constraints**

Manerba Daniele, Mansini Renata

15:35 **Exact and heuristic splitting procedure for fixed sequence services for Home Health Care Routing Problem**

Cissé Mohamed, Kergosien Yannick, Lenté Christophe

TB3 - TSP variants
Room: 3 - Pascal
Chair: Claudio Gambella

14:45 **The Interceptor Vehicle Routing Problem: formulation and Branch and Price algorithm**

Gambella Claudio, Ghaddar Bissan, Naoum-Sawaya Joe

15:10 **A heuristic time-bucket approach for solving large-scale TSPTW arising in postal services**

Bretin Alexis

TB4 - Green vehicle routing and logistics
Room: 4 - Teillac
Chair: Okan Dukkanci

14:45 **A Mass-flow Based MILP Formulation for the Inventory Routing with Explicit Energy Consumption**

He Yun, Jozefowiez Nicolas, Briand Cyril

15:10 **Green Location Routing Problem**

Dukkanci Okan, Y Kara Bahar, Bektas Tolga

TB5 - Facility Location
Room: 5 - Galois
Chair: Maximilian Schiffer

14:45 **Green Hub Location Routing Problem**

Bostel Nathalie, Yang Xiao, Dejax Pierre, Paquet Marc

15:10 **The Location Routing Problem with Intraroute Facilities**

Schiffer Maximilian, Walther Grit

15:35 **A mathematical model for two echelon location routing problem with simultaneous pickup and delivery**

Demircan-Yildiz Ece Arzu, Karaoglan Ismail, Altiparmak Fulya

16:30 - 17:45

TC1 - Rich VRP
Room: 1 - Kastler
Chair: Asvin Goel

16:30 **Combined vehicle routing and truck driver scheduling in the EU and the working time directive**

Asvin Goel

16:55 **VRPTW with European Union regulations**

Naima Belakbir, Bounceur Ahcène, Croguennec Stéphane, Euler Reinhardt, Le Pouliquen Marc, Sevaux Marc, Trevien Jean François

17:20 **VRP++ - A software library for data structures supporting the fast and simple implementation of routing algorithms**

Schönberger Jörn

TC2 - Dynamic vehicle routing
Room: 2 - Besse
Chair: Yann Bartesch

16:30 **Generic and scalable annotation layers for shortest path road networks**

Bartesch Yann, Hug Stefan, Heid Werner

16:55 **Adaptive State Space Partitioning for Dynamic Vehicle Routing Problems**

Soeffker Ninja, Ulmer Marlin, Mattfeld Dirk

TC3 - Maritime transportation
Room: 3 - Pascal
Chair: Sophie Michel

16:30 **Liner shipping speed optimization with synchronization and port call restrictions**

Reinhardt Line , Plum Christian, Pisinger David

16:55 **Global planning in a multi-terminal and multi-modal maritime container port**

Balev Stefan, Michel Sophie, Sanlaville Eric, Schepler Xavier

17:20 **Robust Supply Vessel Planning with Heuristics**

Kisialiou Yauheni, Gribkovskaia Irina

TC4 - Column generation/branch-and-price
Room: 4 - Teillac
Chair: Ann-Kathrin Rothenbächer

16:30 **A branch-price-and-cut algorithm for the mixed capacitated general routing problem with time windows**

Ciancio Claudio, Laganà Demetrio, Vocaturo Francesca

16:55 **Branch-Price-and-Cut for the Generalized Truck-and-Trailer Routing Problem**

Rothenbächer Ann-Kathrin, Drexl Michael, Irnich Stefan

17:20 **The Joint Replenishment Problem with Approximated Routing Costs**

Baller Annelieke , Dabia Said, Dullaert Wout

TC5 - Facility Location
Room: 5 - Galois
Chair: Werner Heid

16:30 **Designing two-echelon distribution networks under demand uncertainty**

Ben Mohamed Imen, Vanderbeck François, Klibi Walid

16:55 **Detecting location routing problems in geomarketing, sales force optimisation and task planning – Specific challenges of real-life instances**
Heid Werner

Wednesday - 08/06

9:15 - 10:30

WA1 - Bike and vehicle sharing
Room: 1 - Kastler
Chair: Bruno Albert Neumann Saavedra

9:15 **A matheuristic for the anticipatory service network design of bike sharing systems**

Neumann Saavedra Bruno Albert, Römer Michael, Crainic Teodor Gabriel, Gendron Bernard, Mattfeld Dirk Christian

9:40 **Modeling Mobility Demands for Bike Sharing Systems**

Brinkmann Jan, Ulmer Marlin, Mattfeld Dirk

10:05 **Workforce Scheduling and Vehicle Sharing to Reduce Carbon Emissions and Improve Service Quality**

Arias Pol, Liu Jiyin, Rana Rupal

WA2 - Collaborative transportation and logistics
Room: 2 - Besse
Chair: M. Grazia Speranza

9:15 **The Vehicle Routing Problem with Occasional Drivers**

Archetti Claudia, Savelsbergh Martin, Speranza M. Grazia

9:40 **Horizontal co-operation in a clustered distribution context**

Defryn Christof, Sörensen Kenneth

10:05 **Optimization of Inbound and Outbound Delivery Scheduling under Stochastic Dynamic Demand**

Cetinkaya Sila, Zhang Liqing, Tekin Eylem

WA3 - Routing with synchronization
Room: 3 - Pascal
Chair: Juliette Medina

9:15 **The Split Delivery Vehicle Routing Problem with Time Windows and Synchronization Constraints**

Bianchessi Nicola, Drexl Michael, Irnich Stefan , Tilk Christian

9:40 **Vehicle routing and scheduling as a resource transfer problem**

Weiss Illa, Schwindt Christoph

10:05 **Combining load plan design and vehicle routing**

Medina Juliette, Hewitt Michael, Lehuede Fabien, Péton Olivier

WA4 - Shortest path problems
Room: 4 - Teillac
Chair: Axel Parmentier

9:15 **Label Setting algorithm with Dynamic update of Pareto Front**

Giret Antoine, Kergosien Yannick, Neron Emmanuel, Sauvanet Gael

9:40 **Integrated Aircraft Routing and Crew Pairing at Air France**

Parmentier Axel, Meunier Frédéric

10:05 **Heuristics for the bi-objective Unidirectional Road Network Design Problem with Disruptions**

Huang Yipeng, Santos Andréa Cynthia, Duhamel Christophe

WA5 - Technician routing
Room: 5 - Galois
Chair: Alejandro Montoya

9:15 **Iterated local search for the workforce scheduling and routing problem**

Xie Fulin, Potts Chris, Bektas Tolga

9:40 **The technician routing problem with conventional and electric vehicles**

Montoya Alejandro, Guéret Christelle, Mendoza Jorge E., Villegas Juan G.

10:05 **An Iterated Local Search Algorithm for Traveling Repairman Problem with Profits**

Avci Mualla Gonca, Avci Mustafa

WA6 - Green vehicle routing and logistics
Room: 6 - A002
Chair: Richard Eglese

9:15 **A Parallel Multi-Start NSGA II Algorithm for the Solution of Multiobjective Route-based Fuel Consumption Open Vehicle Routing Problems**

Psychas Iraklis - Dimitrios, Marinaki Magdalene, Marinakis Yannis, Matsatsinis Nikolaos

9:40 **The Green Load Dependant Vehicle Routing Problem with Backhauls: A Revisited Case Study**

Belloso Javier, Juan Angel, Faulin Javier, Serrano Adrian

10:05 **Modelling choices in Green Vehicle Routing**

Eglese Richard

11:00 - 12:40

WB1 - Freight transportation
Room: 1 - Kastler
Chair: Gustavo Bula

11:00 **Total Risk Routing Minimization for the Fleet Size and Mix Problem for Hazardous Materials Distribution**

Bula Gustavo, Prodhon Caroline, Gonzalez Fabio, Afsar Hasan, Velasco Nubia

11:25 **A MIP formulation for a Rich Vehicle Routing Problem in the food retailing industry**

Tamke Felix

WB2 - Multi-objective VRPs
Room: 2 - Besse
Chair: Geir Hasle

11:00 **Equity Objectives in Vehicle Routing: A Survey and Analysis**

Matl Piotr, Vidal Thibaut, Hartl Richard

11:25 **A Memetic Algorithm for the Mixed Capacitated General Routing Problem with Route Balancing**

Halvorsen-Weare Elin, Hasle Geir, Lyckander Ingvild, Schulz Christian

11:50 **A Two-Phase Heuristic Approach for the Biobjective k-Dissimilar Vehicle Routing Problem**

Zajac Sandra

12:15 **Bi-objective optimization of vehicle routing problem for distribution of perishable food: A goal programming approach**
Yapar Ufuk, Altiparmak Fulya

WB3 - Ports and logistics
Room: 3 - Pascal
Chair: Fabien Tricoire

11:00 **Optimization of a multimodal container transport network: application to the hinterland of the port of Shanghaï**
Zhao Yulong, Bostel Nathalie, Chen Lu, Dejax Pierre

11:25 **Lower Bounds for the Container Ship Stowage Planning Problem**

Roberti Roberto, Pacino Dario

11:50 **Managing the Flow of Containers in a Multimodal Network**

Hemmidy Mohamed, Yassine Adnan, Joncour Cédric, Michel Sophie

12:15 **New advances for the block relocation problem**

Tricoire Fabien, Beham Andreas, Fechter Judith

WB4 - Inventory routing
Room: 4 - Teillac
Chair: Demetrio Laganà

11:00 **An Exact Method for the Periodic Inventory Routing Problem in a Lean Production System**
Laganà Demetrio, Bertazzi Luca, Ohlmann Jeffrey, Ventura Domenico

11:25 **Fleet sizing and cyclic delivery scheduling for in-plant inventory routing**
Duman Necati Oguz, Kuyzu Gultekin

11:50 **An efficient algorithm for the Cyclic Inventory Routing Problem subproblem**
Lefever Wouter, Hadj-Hamou Khaled, Aghezzaf El-Houssaine

WB5 - Rich VRP
Room: 5 - Galois
Chair: Bruce Golden

11:00 **Some Exciting New Problems in Vehicle Routing**
Vigo Daniele, Golden Bruce

11:25 **Integrated Production and Outbound Distribution Planning in the Automotive Industry**
Zesch Felix, Hellingrath Bernd

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Moons Stef, Ramaekers Katrien, Caris An

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Lacomme Philippe, Moukrim Aziz, Quillot Alain, Vinot Marina

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Nikolopoulou Amalia, Repoussis Panagiotis, Tarantilis Christos, Zachariadis Emmanouil

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Vargas Leticia , Jozefowiez Nicolas, Ngueveu Sandra

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Bach Lukas, Hasle Geir, Schulz Christian

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Pollaris Hanne, Braekers Kris, Caris An, Janssens Gerrit K., Limbourg Sabine

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Clavijo Lopez Christian, Labadie Nacima, Prodhon Caroline

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Christiaens Jan, Vanden Berghe Greet

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Orlis Christos, Dullaert Wout, Laganà Demetrio, Vigo Daniele

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Morandi Valentina, Savelsbergh Martin, Angelelli Enrico, Speranza M. Grazia

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Benavent Enrique, Belenguer Jose M., Corberán Angel, Plana Isaac, Sanchis José. M.

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Tilk Christian, Bianchessi Nicola, Drexl Michael , Irnich Stefan, Meisel Frank

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Grangier Philippe, Gendreau Michel, Lehuédé Fabien, Rousseau Louis-Martin

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Grimault Axel, Bostel Nathalie, Lehuédé Fabien

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Hoogeboom Maaike, Dullaert Wout, Lai David, Vigo Daniele

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Mesquita Marta, Paias Ana

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Keskin Merve, Çatay Bülent

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Glock Katharina, Meyer Anne, Tack Guido

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Chair: Alexandre Florio

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Jabali Ola, Hernandez Florent, Gendreau Michel, Rei Walter

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The vehicle routing problem repository
www.vrp-rep.org

What is VRP-REP?

VRP-REP is an open data platform for sharing vehicle routing problem benchmark instances and solutions.

What can you do with VRP-REP?

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- Share instances privately with referees and editors during the reviewing process
- Share your solutions with the community
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