

# **EURO Summer Institute**

## **Maritime Logistics**

Bremen, June 3rd – June 15th, 2012

## **Final report**



Prof. Dr. Christian Bierwirth, Martin-Luther-University Halle-Wittenberg  
Große Steinstrasse 73, D-06108 Halle (Saale), Germany

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## 1. General Information about this Summer Institute

### 1.1 Aims and scope

The growing use of decision support and optimization techniques in the maritime industry gave rise to the idea of an EURO summer institute (ESI) dealing with the versatile challenges of Operations Research in this field. Based on advances in information and equipment technologies, maritime shipping, cargo handling and hinterland transportation yield complex logistics processes that have to be managed in increasingly competitive environments. PhD students with significant experience in maritime logistics have been invited to apply for participation in the school with an unpublished high-quality paper. Aim of the ESI is to bring the young researchers together with academic experts from operations research, logistics and the maritime business. With its orientation, the ESI offers a unique opportunity for young researchers in this field to share experience with colleagues from all over Europe and to enter the scientific community.

## 1.2 Requirements for participation

Participation was limited to a group of about 20 doctoral students or postdocs, usually aged between 25 and 35. They must have gained a significant experience in maritime logistics and be authors of at least one unpublished, high-quality paper. Interested persons had to apply for participation with an unpublished paper, a curriculum vitae and a list of publications at their national OR society. The national societies and IFORS were entitled to nominate up to three applicants, from which the scientific committee selected the group of participants.

## 1.3 Scientific committee

- Carlos Pestana Barros (Technical University of Lisbon, Portugal)
- Christian Bierwirth (University of Halle-Wittenberg, Germany)
- Marielle Christiansen (Norwegian Technical University Trondheim, Norway)
- Kevin Cullinane (Edinburgh Napier University, UK)
- Rommert Dekker (Erasmus University Rotterdam, Netherlands)
- Kjetil Fagerholt (Norwegian Technical University Trondheim, Norway)
- Michel Gendreau (CIRRELT Montreal, Canada)
- Hans-Otto Günther (Technical University of Berlin, Germany)
- Hans-Dietrich Haasis (ISL Bremen, Germany)
- Kap Hwan Kim (Busan National University, South Korea)
- Herbert Kopfer (University of Bremen, Germany)
- Frank Meisel (University of Halle-Wittenberg, Germany)
- Luigi Moccia (ICAR-CNR, Italy)
- Theo Notteboom (University of Antwerp, Belgium)
- Mikhail Postan (Maritime University Odessa, Ukraine)
- Harilaos Psaraftis (National Technical University of Athens, Greece)
- Alexander Smirnov (SPIIRAS, St. Petersburg, Russia)
- Ulla Tapaninen (University of Turku, Finland)
- Albert Veenstra (Erasmus University Rotterdam, Netherlands)
- Iris Vis (University of Groningen, Netherlands)
- Stefan Voß (University of Hamburg, Germany)

## 1.4 Organization committee

The ESI was jointly organized by the Universities of Bremen and Halle-Wittenberg, represented by Christian Bierwirth (Martin-Luther-University Halle-Wittenberg), Hans-Dietrich Haasis (Institute of Shipping Economics and Logistics ISL, Bremen), Herbert Kopfer (University of Bremen), and Frank Meisel (Martin-Luther-University Halle-Wittenberg).

## 1.5 Venue

The city of Bremen is located in the northern part of Germany, quite close to the North Sea. It is one of the Germany's leading logistic regions and home to a large seaport, numerous freight centers and international trade, transport and industrial companies.

The conference was held at the guest house of the University of Bremen, which is located on an island of the river Weser in the heart of the historical center of the old Hanseatic city. Surrounded by water and passing barges, this place gave an inspiring maritime flair to the school. Next to the university guest house, some other places hosted the ESI for a while. The Hamburger Hafen und Logistik AG (HHLA) invited us to visit the fully automated container terminal CTA in Hamburg Altenwerder. The next day, the scientific program took place at the University of Bremen. The BremenPorts authority provided us with a wonderful conference room with a magnificent view over the Weser delta and the harbor of Bremerhaven. Later we took a trip to this area and saw an impressive automobile terminal and container terminals operated by the BLG Logistics Group and Eurokai.

## 2. Participants

### 2.1 Students

The ESI received over 30 applications from early stage researchers in the field of maritime logistics from all over the world. From all applications received, the scientific committee selected a group of 23 researchers from Australia, Belgium, Brazil, Denmark, France, Germany, India, Italy, the Netherlands, New Zealand, Norway, Suisse, Turkey, Ukraine, the United Kingdom and the United States to visit the ESI. Among these applications, 17 students were nominated by European national OR societies and two were nominated by IFORS. In addition, four applications were accepted as "free riders". The conference was visited by 22 students, 9 females and 13 males. One accepted person did not attend the ESI.

Mr.	Abdul Rahman, Noorul Fitri	Liverpool John Moores University, United Kingdom
Mr.	Brito, Thiago Barros	University of Sao Paulo, Polytechnic School, Brazil
Mr.	Bruns, Florian	University of Osnabrück, Germany
Dr.	Caballini, Claudia	Università di Genova, Italy
Dr.	Chandra, Saurabh	Indian Institute of Management (IIM), Lucknow, India

Ms.	Dangaard Brouer, Berit	Technical University of Denmark, Denmark
Ms.	Echeverry, Ana Halabi	Macquarie University, Sydney, Australia
Dr.	Emde, Simon	Friedrich-Schiller-University Jena, Germany
Mr.	Gharehgozli, Amir Hossein	Erasmus University Rotterdam, Netherlands
Ms.	Gruşevskaia, Ecaterina	Odessa National Maritime University, Ukraine
Ms.	Guldogan, Evrim Ursavas	University of Economics, Izmir, Turkey
Ms.	Hamidou, Mansoriya	University of Le Havre, France
Mr.	Islam, Samsul	University of Auckland, New Zealand
Dr.	Kjeldsen, Karina Hjortshøj	Aarhus University, Denmark
Ms.	Mulder, Judith	Erasmus Research Institute of Management, Rotterdam, Netherlands
Mr.	Pantuso, Giovanni	Norwegian University of Science and Technology, Trondheim, Norway
Mr.	Papageorgiou, Dimitri J.	Georgia Institute of Technology, Atlanta, US
Mr.	Plum, Christian E. M.	DTU Technical University of Denmark, Kgs. Lyngby, Denmark
Mr.	Tran, Nguyen Khoi	University of Bremen, Germany
Mr.	Umang, Nitish	Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland
Mr.	Verstichel, Jannes	Katholieke Hogeschool Sint-Lieven, Belgium
Ms.	Zehendner, Elisabeth	Ecole des Mines de Saint-Etienne, France

## 2.2 Speakers

Prof. Dr.	Bierwirth, Christian	Martin-Luther-University Halle-Wittenberg, Germany
Prof. Dr.	Dekker, Rommert	Erasmus University Rotterdam, Netherlands
Prof. Dr.	Fagerholt, Kjetil	Norwegian University of Science and Technology, Trondheim, Norway
Prof. Dr.	Haasis, Hans-Dietrich	University of Bremen, Germany
Dr.	Meisel, Frank	Martin-Luther-University Halle-Wittenberg, Germany
Prof. Dr.	Sha, Mai	Shanghai Maritime University, China
Prof. Dr.	Vis, Iris	University of Groningen, Netherlands
Prof. Dr.	Voß, Stefan	University of Hamburg, Germany

### 3. Scientific program

#### 3.1 Conference format

The scientific program of the ESI was subdivided into different areas of research, addressing the seaside operations planning, the management of container yards and the hinterland transportation at seaport terminals as well as liner shipping network design and maritime ship routing and scheduling problems. Every student presented his/her paper in a 90 minute time slot including an intensive group discussion, aiming to improve and prepare the papers for possible publication in scientific journals.

Several invited lectures and discussion rounds on fields of special interest accompanied the scientific program of the ESI. Prof. Stefan Voß gave a survey on recent developments for the management of seaport terminals. New strategies and operations for hinterland transportation have been analyzed in the talk of Prof. Rommert Dekker. The lecture of Prof. Iris Vis considered the impact of equipment selection decisions on the yard operations in container terminals. Berth allocation, crane assignment and scheduling problems in such terminals were discussed in the lecture of Prof. Bierwirth. New research topics in the field of seaside operations planning were presented by Dr. Frank Meisel. Prof. Mai Sha and Prof. Hans-Dietrich Haasis reported on the role of Third Party Logistics in port and shipping operations and the future development of the maritime business. Finally, maritime ship scheduling and inventory routing problems was the subject of the presentation of Prof. Kjetil Fagerholt.

#### 3.2 Conference schedule

##### Monday June 4<sup>th</sup>, University Guest House

- 9.00 Opening, introduction of participants & overview of the conference
- 10.00 **Paper 1:** *Samsul Islam, New Zealand*  
“Factors affecting seaport capacity”
- 11.30 **Paper 2:** *Giovanni Pantuso, Norway*  
“A survey on maritime fleet size and mix problems”
- 13.00 Lunch break
- 14.30 **Lecture 1:** *Prof. Bierwirth, University of Halle-Wittenberg*  
“Seaside operations planning in container terminals”
- 16.30 City tour of Bremen with *guide Christian*
- 19.00 Dinner at the youth hostel

## Tuesday June 5<sup>th</sup>, University Guest House

- 9.00 **Paper 3:** *Nitish Umang, Switzerland*  
“Large scale robust optimization of bulk port operations”
- 10.30 **Paper 4:** *Evrin Ursavas Guldogan, Turkey*  
“A priority based online berth allocation policy with stochastic arrival&service times”
- 12.00 Lunch break
- 13.30 **Paper 5:** *Jannes Verstichel, Belgium*  
„Exact and heuristic methods for placing ships in locks”
- 15.00 **Paper 6:** *Simon Emde, Germany*  
“Berth allocation in CT’s that service both feeder ships and deep-sea vessels”
- 16.30 Tea break
- 17.00 **Discussion round 1:** Seaside port operations (moderated by *Frank Meisel*)
- 19.00 Dinner at the youth hostel

## Wednesday June 6<sup>th</sup>, Excursion day

- 8.00 Bus travel from the youth hostel to the city of Hamburg
- 10.00 Visit of the Container Terminal Hamburg Altenwerder (CTA)
- 12.00 Trip to the University of Hamburg
- 12.30 Lunch break
- 13.30 **Lecture 2:** *Prof. Stefan Voß, University of Hamburg, Germany*  
“A survey of recent developments in seaport terminal management”
- 15.30 City tour of Hamburg with *guide Stefan*
- 18.00 Bus travel to Bremen
- 20.00 Arrival at the youth hostel

## Thursday June 7<sup>th</sup>, University Campus

- 8:30 Tram trip to the University Campus
- 9.00 **Paper 7:** *Ana Halabi Echeverry, Australia*  
“Modelling strategic information flows within the port decision system approach (PDSA) using relational learning methods”
- 10.30 **Paper 8 (cancelled)**
- 12.00 Lunch break
- 13.30 **Paper 9:** *Claudia Caballini, Italy*  
“The rail port cycle: Modeling, simulation and optimization”
- 15.00 **Lecture 3:** *Prof. Rommert Dekker, Erasmus University Rotterdam*  
“Strategies and operations for Hinterland transportation”
- 17-00 Campus tour
- 19.00 Visit of a beer-garden

### Friday June 8<sup>th</sup>, University Guest House

- 9.00 **Paper 10:** *Elisabeth Zehendner, France*  
 “Benefits of a truck appointment system on the service quality of inland transport modes at a multimodal container terminal”
- 10.30 **Discussion round 2:** Hinterland transportation (moderated by *Rommert Dekker*)
- 12.00 Lunch break
- 13.30 **Paper 11:** *Ecaterina Grușevskaia, Ukraine*  
 “Modeling the interaction of cargo and financial flows in port’s operator activity”
- 15.00 Free afternoon
- 19.00 Dinner at the youth hostel
- 20.00 Night excursion

### Saturday June 9<sup>th</sup>, Social events

- 10.00 Trip from Bremen to the art village Worpswede
- 18.00 Viewing the European Soccer Championship “Netherlands-Denmark”

### Sunday June 10<sup>th</sup>, A day off

### Monday June 11<sup>th</sup>, University Guest House

- 9.00 **Paper 12:** *Thiago Barros Brito, Brazil*  
 „A Hybrid Simulation Methodology Approach Applied to Complex Logistic Systems Planning”
- 10.30 **Paper 13:** *Noorul Shaiful Fitri Abdul Rahman, United Kingdom*  
 „A selection of shipping business strategy for super slow steaming using the decision making technique”
- 12.00 Lunch break
- 13.30 **Paper 14:** *Amir Hossein Gharehgozli, Netherlands*  
 “Generalized asymmetric traveling salesman problem: Sequencing container storage and retrieval requests at a container terminal”
- 15.00 **Paper 15:** *Florian Bruns, Germany*  
 “Integrated crane and storage planning in hinterland terminals”
- 16.30 **Lecture 4:** *Prof. Iris Vis, University of Groningen*  
 “Equipment selection and yard operations in container terminals”
- 19.00 Dinner at the youth hostel

### Tuesday June 12<sup>th</sup>, University Guest House

- 9.00 **Paper 16:** *Mansoriya Hamidou, France*  
 “Container Safety Storage on a Port Terminal”



- 10.30 **Discussion round 3:** Yard management (moderated by *Iris Vis*)
- 12.00 Lunch break
- 13.30 **Lecture 5:** *Prof. Mai Sha, Shanghai Maritime University & Prof. Hans-Dietrich Haasis, University of Bremen: "Future development of the maritime business"*
- 15.30 **Paper 17:** *Judith Mulder, Netherlands*  
"Designing service networks in liner shipping"
- 17.00 **Paper 18:** *Saurabh Chandra, India*  
"Multi-commodity inventory maritime routing problem with spot cargoes: An application to outbound maritime automotive logistics"
- 19.00 Dinner at the youth hostel

### **Wednesday June 13<sup>th</sup>, Excursion day**

- 8.30 Bus travel from the youth hostel to the city of Bremerhaven
- 10.00 Reception and welcome at bremenports, Bremerhaven
- 11.00 **Lecture 6:** *Prof. Kjetil Fagerholt, Norwegian University of Technology Trondheim* "Maritime ship scheduling and inventory routing"
- 13.00 Lunch break
- 14.30 Walk at the waterfront
- 15.30 Visit of the automobile terminal Bremerhaven and the German National Emigrant Museum
- 18.30 Bus travel to Bremen
- 19.30 Dinner at the youth hostel

### **Thursday June 14<sup>th</sup>, University Guesthouse**

- 9.00 **Paper 19:** *Dimitri J. Papageorgiou, United States*  
"A two-stage decomposition algorithm for single product maritime inventory routing"
- 10.30 **Paper 20:** *Karina Hjortshoej Kjeldsen, Denmark*  
"A column generation based heuristic for routing ships and cargo in liner shipping"
- 12.00 Lunch break
- 13.00 **Discussion round 4:** Maritime ship routing (moderated by *Kjetil Fagerholt*)
- 15.00 Free afternoon
- 19.00 Dinner at the youth hostel

### **Friday June 15<sup>th</sup>, University Guest House**

- 9.00 **Paper 21:** *Berit Dangaard Brouer, Denmark*  
"A matheuristic for the liner shipping network design problem"

- 10.30 **Paper 22:** *Christian E. M. Plum, Denmark*  
 “A double column generation method for the liner shipping network design problem”
- 12.00 Lunch break
- 13.30 **Paper 23:** *Khoi Nguyen Tran, Germany*  
 “A review of port development and network optimization study in liner shipping”
- 15.00 **Discussion round 5:** Maritime network design (moderated by *Khoi Nguyen Tran*)
- 17.00 Closing
- 18.00 Farewell barbecue party

### 3.3 Special journal issues

Papers presented at the ESI, which have a quantitative focus will be considered for possible publication in a special issue on “maritime logistics” of the European Journal of Operational Research (EJOR). Papers which take a managerial perspective on maritime logistics will be considered for a possible publication in a special issue of Logistics Research.

## 4. Social program

The Bremen region offers many opportunities for sightseeing trips, e.g. to the historical city center, the home of the Bremen Town Musicians, to Germany's oldest artificial harbor in Vegesack, and many other cultural and industrial sites. The ESI program contained several social events and trips around the region.

- Welcome reception
- Guided city tour and visit of the world cultural heritage Bremen townhall
- Bremen university campus tour ending in a beer garden
- Visit of the container terminal Altenwerder (CTA) in Hamburg
- Guided rainy bus tour through Hamburg
- Bremen night excursion
- Day trip to the art village Worpswede
- Joint viewing of the European soccer championship
- Visit of the automobile terminal in Bremerhaven
- Farewell barbecue party

In the beginning, the participants of the ESI considered a period of two weeks as quite a long time for a summer school. But already after a few days they really became a “group”. This process was pushed on by several activities. The European soccer championship helped a lot to intensify socializing, especially the match between Denmark and the Netherlands. Also our half-time weekend trip to the around the region of Bremen and the visit of the art village Worpswede entertained all participants. Although not officially confirmed, it has been noted that both the Friday-night excursion and the farewell barbecue both ended early next morning.

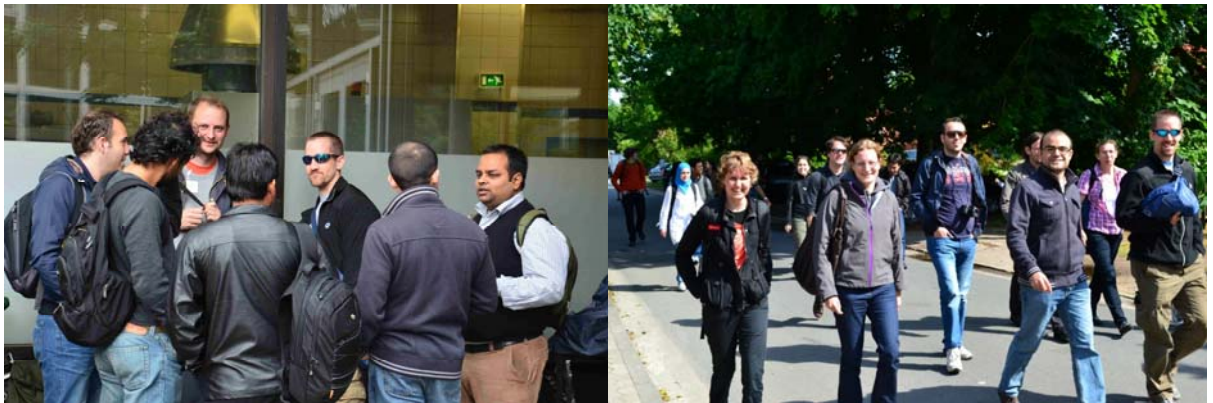
## 5. Impressions of the ESI

... being at work





... and on excursion





## 6. Financial report

### 6.1 Sponsoring

The total conference cost was estimated on the basis of 1.000 € per student. For 19 participants nominated by IFORS and the national OR societies the required funding was met by EURO. Furthermore, the German OR society (GOR) and both organizing universities have sponsored the ESI. This allowed accepting some “free riders” as recommended by the ESI scientific committee. Thanks to the generous support of the sponsors, participation and accommodation was free for all participants.

European Association of OR societies (EURO)	19.000,00 €
Gesellschaft für Operations Research (GOR)	2.000,00 €
University of Bremen	1.500,00 €
University of Halle-Wittenberg	500,00 €
<i>Total</i>	<b>23.000,00 €</b>

## 6.2 Cost

The cost estimate has been met as it is shown below.

Conference room and infrastructure	1.500,00 €
Accommodation of students (incl. breakfast & dinner)	9.100,00 €
Accommodation of invited speakers (20 nights in total)	1.100,00 €
Lunches	2.400,00 €
Conference drinks	300,00 €
Invited speakers cost (traveling cost & expenses)	4.400,00 €
Sightseeing (incl. meals, bus rental, guided tours & public transport)	3.200,00 €
Organization (secretary, conference materials, bank fees etc.)	1.000,00 €
	<hr/>
<i>Total</i>	<b>23.000,00 €</b>

## 7. Acknowledgments

The summer institute offered a unique opportunity for young researchers to get into contact with recent researches and practice in the field of maritime logistics and share experiences with colleagues from all over the world. We would like to thank everybody who has supported the 2012 ESI on maritime logistics and helped us make it a success.

Halle and Bremen, July 3<sup>rd</sup> 2012

Prof. Dr. Christian Bierwirth

(Chairman of the ESI on Maritime Logistics 2012)