

EURO Summer Institute on Cutting and Packing

Porto, Portugal, July 16-27, 2012

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The Summer Institute took place in Porto, Portugal during 16th and 27th July 2012 and focused on Cutting and Packing problems.

The venue of the Summer Institute was »Seminário de Vilar« located above the river Douro. This was a former convent, which has been rebuilt, expanded and renovated. Now, it serves as a convention center which still runs by the Diocese of Porto. During the program, it offered all the capacities and facilities that are necessary for professional interaction and development of valuable connections between participants.



Seminário de Vilar, the venue of the Summer Institute
(photo by Voar Alto on the map, in Google Earth)

The official part of the program started on Monday afternoon. The organizing committee's chair Prof. António Miguel Gomes greeted the participants with a welcome speech. He pointed out that the main goal behind organizing the Summer Institute is to bring together young researchers with academic experts in the field in plenary, seminar and tutorial-style sessions to share research accomplishments, contribute ideas and identify directions for future research and collaboration. He then represented an overview about the scientific and social programs.



View of Porto city from the venue of the Summer Institute

Selected participants were limited to a group of early stage researchers, who were either Ph.D. students or who had been less than two-year research experience since completing a Ph.D. in an area related to Cutting and Packing. In addition, each participant was an author of at least one unpublished paper.

During the program, every participant presented the corresponding research paper which was on a topic from the following list:

- Pallet building and truck loading strategies for an inter-depot transportation problem, presented by Maria Teresa Alonso Martínez.
- Integrated Pallet Loading and Container Loading Problem - A Case Study, presented by Maria da Graça Costa.
- Construction heuristics for two-dimensional irregular shape bin packing with guillotine constraints, presented by Xiaozhou Zhao.
- A nonlinear approach to the Nesting Problem, presented by Pedro Rocha.
- An Optimization Model for the Vehicle Routing Problem with Practical Three-Dimensional Loading Constraints, presented by Leonardo Junqueira.
- GRECT: A local search algorithm for the rectilinear packing area minimization problem, presented by Marisa Oliveira.
- GRASP with Path Relinking for the Two-Dimensional Loading Capacitated Vehicle Routing Problem, presented by Benjamin Alonso.



Participants and members of the scientific committee during the social program

- A Comparative Study of Evaluations Heuristics for Solving the Multi-Objective Container Loading Problem, presented by Yanira Gonzalez.
- An Exact Algorithm for the Two-Dimensional Orthogonal Packing Problem with Unloading Constraints, presented by Jean-François Côté.
- Fast Pattern-Based FFD and BFD for Large Cutting Stock Problems, presented by Filipe Brandão.
- Exact Solution of a Two-Dimensional Cutting Problem with Defects – A Dynamic Programming-Based Approach, presented by Mohsen Afsharian.
- Three Dimensional Bin Packing Problem applied to air cargo, presented by Celia Paquay.
- Constraint Programming Approaches for 3D Orthogonal Packing, presented by Marat Mesyagutov.
- An analysis of problem instances, data sets and problem generators used in computational experiments for the rectangular Identical Item Packing Problem, presented by Elsa Silva.

The available time for the presentation was longer than the usual one at conferences. Thus, every presenter either used this extra time to make a detailed presentation of the research work or used it to show some additional ongoing work to get insights and advices to the presented work. Moreover, in order to have an organized discussion, one member of the scientific committee together with one of the participants assigned to each paper to read it with more detail. Consequently, all participants and scientific committee members intensively discussed during workshop sessions about the presented topics.

In addition to presentations, the invited speakers and scientific committee members gave tutorials on selected topics: Prof. Dr. Julia Bennell from the university of Southampton, UK, lectured on »meta-heuristics applied to cutting and packing problems«. »One-dimensional cutting and packing problems, models and exact resolution approaches« discussed by Prof. Dr.

Valério de Carvalho from the university of Minho, Portugal. Prof. Dr. Gerhard Wäscher from the university of Magdeburg, Germany, lectured on »cutting and packing typology«. »Constraint programming applied to cutting and packing problems« introduced and discussed by Prof. Dr. Maria Antónia Carravilla from the university of Porto, Portugal. Prof. Dr. António Miguel Gomes from the university of Porto, Portugal, gave a lecture on »nesting problems - algorithms and geometry«. »Integration of cutting and packing problems with other problems« was investigated by Prof. Dr. José Fernando Oliveira from the university of Porto, Portugal.

By the end, participants understood principles behind the typology of cutting and packing problems, learned about models and exact solution approaches for solving one and two-dimensional cutting and packing problems, identified the types of situations where meta-heuristics may be used in the area of cutting and packing, acquired the ability to use constraint programming to deal with cutting and packing problems, learned how to integrate some well known cutting and packing problems with other problems, learned about algorithms and geometry in nesting problems, got hands-on experience of the related software which can be designed to solve cutting and packing problems.

Combined with the scientific program, there was also an attractive social program which encouraged communication and feeling of togetherness. There was a city tour through the world heritage patrimony city center and the main attractions; a special visit to Porto wine cellars; an unforgettable boat trip to the heart of Douro Valley, and a wonderful visit to the modern art museum of Serralves gardens.

For the author of this report, this Summer Institute was a special experience since it provided me valuable insights to the research as well as technical aspects needed to work on my topic.

I would like to thank the members of the organizing committee in supporting professionally and fruitfully the program. Cordial thanks also to GOR and all the other sponsors and collaborating institutions whose names can be found at the homepage of the Summer Institute:

<http://paginas.fe.up.pt/~esicup/extern/ESI-CP/index.php?n=Main.AimsAndScope>

