

# EUROGEN 2019

## Programme





## Welcome to EUROGEN 2019

Welcome to the 13<sup>th</sup> International Conference on Evolutionary and Deterministic Computing for Industrial Applications.

EUROGEN 2019 aims at bringing together specialists from Universities, Research Institutions and Industries developing or applying Evolutionary and Deterministic Methods in optimization of design and emphasizing industrial and societal applications.

EUROGEN 2019 will be the 13<sup>th</sup> of a series of International Conferences previously held in Las Palmas de Gran Canaria (1995), Trieste (1997), Jyväskylä (1999), Athens (2001), Barcelona (2003), Munich (2005), Jyväskylä (2007), Krakow (2009), Capua (2011), Las Palmas de Gran Canaria (2013), Glasgow (2015) and Madrid (2017).

This series of conferences was originally launched by the European Thematic Network INGENET. EUROGEN 2019 is an ECCOMAS Thematic Conference in association with ERCOFTAC, represented by its Special Interest Group (SIG) on Design Optimization, in the context of the CAERO2 EC-Project.

More than 85 participants from 18 countries (not only from Europe) are expected making EUROGEN 2019 a truly international event.

The scientific programme comprises five keynote lectures from internationally known researchers and eleven Mini-Symposia in various fields of research. We thank the symposia organizers for their contribution for the success of this conference.

In 2019 the EUROGEN conference will be hosted by the University of Minho at the historical town of Guimarães, in the North of Portugal. Guimarães was the first capital of Portugal in the 12<sup>th</sup> century as is an exceptionally well-preserved and authentic example of the evolution of a medieval settlement into a modern town, as recognized by the World Heritage Convention of UNESCO. Guimarães is easily accessible from the International Airport of Porto.

Guimarães, September 2019

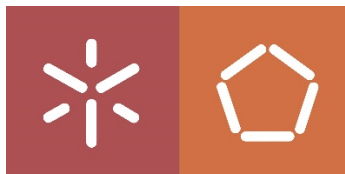
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- J. Periaux, CIMNE, Univ. Jyväskylä and ECCOMAS (co-chair)
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## Important Information

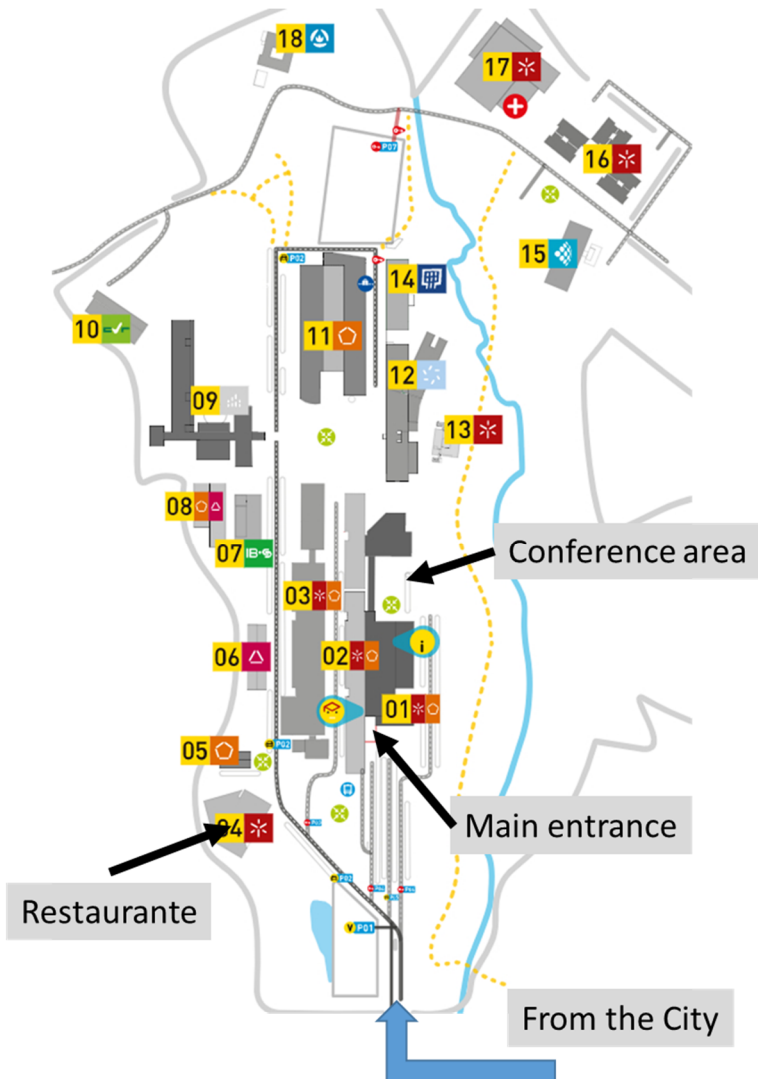
## Guimarães City Map with the Conference Location



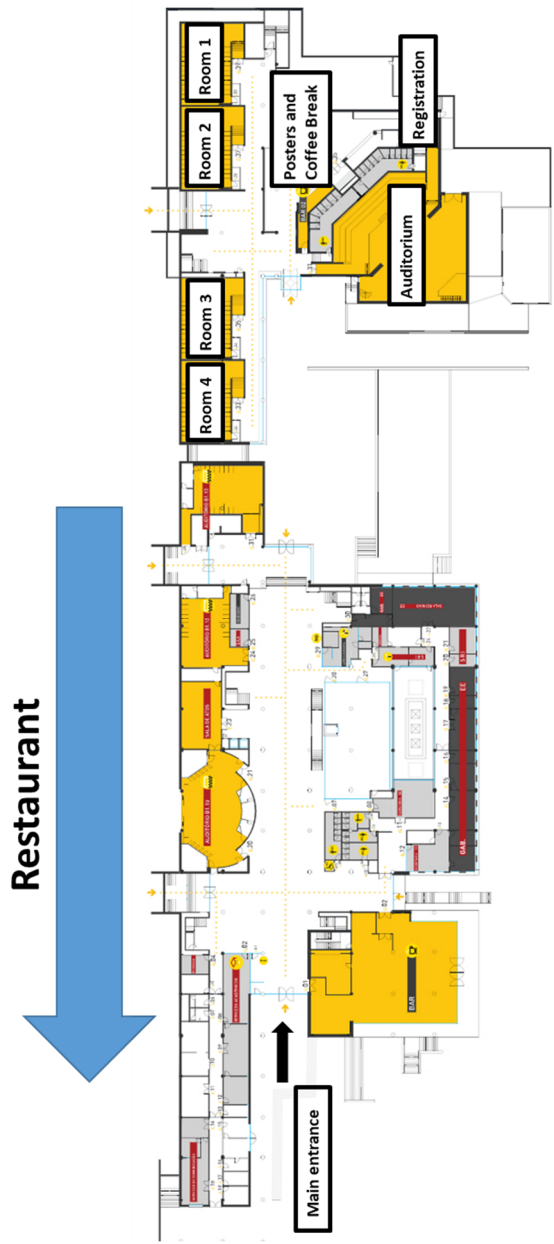


## Maps

*Campus*



*Conference area*



## Social Programme

### ***Welcome reception (Thursday, 17.20-19.00)***

Welcome reception will take place in the Hall of the Auditorium (see previous map) and outside of the building (depending on the weather).

### ***City Tour (Friday, 17.20-19.00)***

The meeting for the guided visit will be in front of the Ducal Palace, near the Castle. No transportation will be provided, as this place is 5 minutes walking from the University.

### ***Banquet (Friday, 20.00-23.30)***

The banquet will take place at the Pousada de Santa Marinha da Costa located on the hill near the city. Transportation will be provided, including return to the city.



## Notes for speakers

- The total time for ORAL presentations is 20 minutes (15 minutes for presentation and 5 minutes for questions). Please, prepare your presentation accordingly. Sessions 1 to 4 include parallel sessions.
- The POSTER session includes 5 minutes for oral presentation. Please, prepare around 5 slides for your presentation.
- A projector will be available.
- For the presentation use your own computer or borrow one of the presenters of your session.
- Each speaker must introduce himself to the chairperson of the session 10 minutes before the beginning of the corresponding session.
- Posters must be placed in the assigned location until one hour before starting the poster session.

## Wireless Network

- Network: **eduroam**
- Username: **eurogen@guest**
- Password: **2019!!eurogen**

## Programme

Hour	Thursday, September 12	Friday, September 13	Saturday, September 14
8.00 9.00	Registration		
9.00 9.20	Opening		
9.20 10.10	KN 1	KN 3	KN 5
10.10 10.30	Coffee Break	Coffee Break	Coffee Break
10.30 12.30	Session 1	Session 3	Session 4 (10.30-12.10)
12.30 14.00	Lunch	Lunch	Closing (12.10-12.30)
14.00 14.50	KN 2	KN 4	
14.50 15.10	Coffee Break	Coffee Break	
15.10 17.10	Session 2	Posters Session	
17.20 19.00	Welcome Reception	City tour	
20.00		Banquet	

**Thursday, September 12**

Hour	Room 1	Room 2	Room 3	Room 4
8.00 9.00	Registration			
9.00 9.20	Openning			
9.20 10.10	KN 1 - Massimiliano Vasile <b>Multi-objective Optimal Control Under Epistemic Uncertainty</b>			
10.10 10.30	Coffee Break			
10.30 12.30	MS1-A	MS2	MS4-A	
12.30 14.00	Lunch			
14.00 14.50	KN 2 - Maria João Alves <b>Bilevel optimization with an application in the design of electricity retail tariffs</b>			
14.50 15.10	Coffee Break			
15.10 17.10	MS1-B	MS3	MS4-B	MS5
17.20	Welcome Reception			

**Friday, September 13**

Hour	Room 1	Room 2	Room 3	Room 4
9.20 10.10	KN 3 - Carlos Fonseca <b>An Integrated View of Selection in Evolutionary Algorithms</b>			
10.10 10.30	Coffee Break			
10.30 12.30	MS6-A	MS7-A	MS4-C	MS8 and MS9
12.30 14.00	Lunch			
14.00 14.50	KN 4 - José Covas <b>Optimization problems and challenges in polymer processing</b>			
14.50 15.10	Coffee Break			
15.10 17.10	Posters Session	Posters Session	Posters Session	Posters Session
17.20 19.00	City tour			
20.00	Banquet			

**Saturday, September 14**

Hour	Room 1	Room 2	Room 3
9.20 10.10	KN 5 - Kyriakos Giannakoglou <b>OpenFOAM-based Continuous Adjoint Methods for Shape Optimization &amp; Robust Design</b>		
10.10 10.30	Coffee Break		
10.30 12.10	MS6-B	MS7-B	MS11
12.10 12.30	Closing (12.10-12.30)		



## Detailed Programme

Thursday, September 12

10.30 11.50	ROOM 1
Paper ID	<b>MS01 - Multi-fidelity, surrogate modelling and design exploration of real world problems Session A - Chair: Domenico Quagliarella</b>
20	Surrogate-Based Optimization Exploiting Multiple Surrogate Models <i>Paul Beaucaire, Charlotte Beauthier and Caroline Sainvitu</i>
3	Towards CAD-based shape optimization of aircraft engine nozzles <i>Simon Bagy, Bijan Mohammadi, Michaël Méheut, Mathieu Lallia and Pascal Coat</i>
22	Multi-Additional Sampling for Multi-Objective and Multi-Fidelity Optimization Applied to Airfoil Design Problems <i>Attaphon Ariyarat, Masahiro Kanazaki, Yuki Kishi and Sujin Bureerat</i>
29	Take-off and approach setting optimization via High Order Singular Value Decomposition <i>Sergio de Lucas and David E. Funes</i>

Thursday, September 12

15.10 16.10	ROOM 1
Paper ID	<b>MS01 - Multi-fidelity, surrogate modelling and design exploration of real world problems Session B - Chair: Alexandre Delbem</b>
25	Multi-fidelity Gaussian Process Regression for Propeller Optimisation Under Uncertainty <i>Peter Zeno Korondi, Lucia Parussini, Mariapia Marchi and Carlo Poloni</i>
70	Application of Multiple Optimizers on Expensive CFD Problems <i>Jörn Richter, Leonie Kallabis, Frederik Rehbach, Dennis Hermanns, Abdul Iqbal, Kanwalmeetsingh Kochar, Jannis Möller, Martin Zaefferer and Boris Naujoks</i>
21	Use of Three-Dimensional Surrogate Models to Speed Up the Global Shape Optimization, in Supersonic Flow <i>Adriana Nastase</i>

Thursday, September 12

10.30 12.30	<b>ROOM 2</b>
<b>Paper ID</b>	<b>MS02 - Recent Advances in Numerical Optimization and Optimal Control and its Applications</b> <b>Chairs: <i>Fernanda Costa and Rui Pereira</i></b>
67	Irrigation planning with fine meshes <i>Sofia O. Lopes, Fernanda Costa, Rui Pereira, M. T. Malheiro and Fernando A C C Fontes</i>
76	Temperature Time Series Forecasting in The Optimal Challenges in Irrigation (TO CHAIR) <i>A. Manuela Gonçalves, Cláudia Costa, Marco Costa, Sofia O. Lopes and Rui Pereira</i>
68	Numerical Computation of Optimal Path and Path-Following Control in Airborne Wind Energy Systems <i>Manuel C.R.M. Fernandes, Luís Tiago Paiva and Fernando A.C.C. Fontes</i>
36	Topology Optimization of Elastomer Damping Devices for Space Application <i>Sylvain Burri, Antoine Legay, Jean-François Deü, Marie De Rochambeau and Pierre-Jean Godart</i>
10	A Two-Phase Heuristic Coupled DIRECT Method for Bound Constrained Global Optimization <i>M. Fernanda P. Costa, Edite M. G. P. Fernandes and Ana Maria A. C. Rocha</i>
14	A Multiple Shooting Descent-based Filter Method for Optimal Control <i>Gisela Ramadas, Edite Fernandes, Ana Maria Rocha and M. Fernanda Costa</i>

Thursday, September 12

15.10 16.10	<b>ROOM 2</b>
<b>Paper ID</b>	<b>MS03 - Single and Multiobjective Bilevel Optimization</b> <b>Chair: <i>Carlos Henggeler Antunes</i></b>
17	An evolutionary algorithm for a biobjective bilevel routing problem <i>Herminia I. Calvete, Carmen Galé and José A. Iranzo</i>
28	A Bilevel Approach to Optimal Price-Setting of Time-and-Level-of-Use Tariffs <i>Mathieu Besançon, Miguel Anjos, Luce Brotcorne and Juan Gomez-Herrera</i>
12	A bi-level optimization approach to define dynamic tariffs with variable prices and periods in the electricity retail market <i>Maria Inês Soares, Maria João Alves and Carlos Henggeler Antunes</i>

Thursday, September 12

10.30 12.10	<b>ROOM 3</b>
<b>Paper ID</b>	<b>MS04 - Adjoint methods for Multi-physics, including Applications</b> <b>Session A - Chairs: Kyriakos Giannakoglou and Gilbert Rogé</b>
	Overview of the MADELEINE project <i>Michaël Méheut</i>
19	Geometric Inequality Constraints in Continuous Adjoint-Based Shape Optimization <i>Niklas Kühl and Thomas Rung</i>
13	CFD based topology optimization for turbine blade tip <i>Jack Cundall, Alistair John, Ning Qin, Shahrokh Shahpar, Eoardo Lombardi, Rocco Arpa, Haysam Telib</i>
24	The influence of design space choices on the adjoint optimisation of transonic compressor blades <i>Alistair John, Ning Qin and Shahrokh Shahpar</i>

Thursday, September 12

15.10 17.10	<b>ROOM 3</b>
<b>Paper ID</b>	<b>MS04 - Adjoint methods for Multi-physics, including Applications</b> <b>Session B - Chairs: Shahrokh Shahpar and Haysam Telib</b>
7	An unsteady aerodynamic/aeroacoustic optimization framework using continuous adjoint <i>Morteza Monfaredi, Xenofon Trompoukis, Konstantinos Tsiakas and Kyriakos Giannakoglou</i>
31	Analysis of discrete adjoint fields for 2D Euler flows <i>Jacques Peter, Clément Labbe and Florent Renac</i>
32	A comparison of different formulations for aero-structural optimization of trimmed transport aircraft <i>Mohammad Abu-Zurayk, Andrei Merle, Caslav Ilic, Stefan Goertz, Matthias Schulze and Thomas Klimmek</i>
52	Coupled discrete adjoints for multiphysics in SU2 <i>Ole Burghardt and Nicolas R. Gauger</i>
56	The Cybermatrix Protocol: A link between classical aircraft design and formal multidisciplinary optimization approaches <i>Caslav Ilic, Andrei Merle, Mohammad Abu-Zurayk, Martin Leitner, Matthias Schulze, Andreas Schuster, Michael Petsch and Sebastian Gottfried</i>
65	On the selection of the most appropriate MDO formulation with respect to the problem dimension: application to realistic aerostructure wing design <i>Matthias De Lozzo, François Gallard, Anne Gazaix, Mohammad Abu-Zurayk, Caslav Ilic, Matthias Schulze, Olivier Amoignon, Fatima Daim, Gilbert Rogé, Steven Kleinveld, Ximum Loyatho and Laurent Daumas</i>

## Friday, September 13

10.30 11.50	<b>ROOM 3</b>
<b>Paper ID</b>	<b>MS04 - Adjoint methods for Multi-physics, including Applications Session C - Chairs: <i>Michaël Méheut and Mohammad Abu Zurayk</i></b>
58	High-Fidelity Adjoint-based Aircraft Shape Optimization with Aeroelastic Trimming and Engine Coupling <i>Andrei Merle, Caslav Ilıc, Mohammad Abu-Zurayk, Jannik Häßy, Richard-Gregor Becker, Matthias Schulze and Thomas Klimmek</i>
34	Adjoint-based Aerodynamic Optimization of a Business Jet Flexible Wing <i>Konstantinos Tsiakas, Xenofon Trompoukis, Varvara Asouti, Kyriakos Giannakoglou, Olivier Amoignon, Gilbert Rogé, Steven Kleinveld, Ximun Loyatho and Laurent Daumas</i>
38	Discrete Adjoint Approaches for CHT Applications in OpenFOAM <i>Markus Towara, Johannes Lotz and Uwe Naumann</i>
27	Adjoint-based optimization for a jet-engine fan blade design <i>Andrea Giugno, Shahrokh Shahpar and Alessandro Sorce</i>

## Thursday, September 12

15.10 16.10	<b>ROOM 4</b>
<b>Paper ID</b>	<b>MS05 - Design support tools in industrial and scientific applications Chair: <i>Célio Fernandes</i></b>
2	Assessment of exergy analysis of CFD simulations for the evaluation of aero-thermo-propulsive performance of aerial vehicles <i>Christelle Wervaecke, Ilias Petropoulos and Didier Bailly</i>
39	Towards an open-source framework for aero-structural design and optimization within the SU2 suite <i>Rocco Bombardieri, Ruben Sanchez, Rauno Cavallaro and Nicolas R. Gauger</i>
11	Surrogate-Based Shape Optimization of Centrifugal Pumps for Automotive Engine Cooling Systems <i>Remo De Donno, Alessia Fracassi, Antonio Ghidoni, Gianmaria Noventa and Stefano Rebay</i>

## Friday, September 13

10.30 12.30	<b>ROOM 1</b>
<b>Paper ID</b>	<b>MS06 - EMO - Evolutionary Multi-Objective Optimization Session 1 - Chair: Sanaz Mostaghim</b>
6	The Effects of Crowding Distance and Mutation in Multimodal and Multi-objective Optimization Problems <i>Mahrokh Javadi, Heiner Zille and Sanaz Mostaghim</i>
30	Combining Manhattan and Crowding distances in Decision Space for Multimodal Multi-objective Optimization problems <i>Mahrokh Javadi, Cristian Ramirez Atencia and Sanaz Mostaghim</i>
49	Solving multiobjective engineering design problems through a Scalarized Augmented Lagrangian Algorithm (SCAL) <i>Lino Costa, Isabel Espirito Santo and Pedro Oliveira</i>
61	Incorporation of Region of Interest in a Decomposition-Based Multi-Objective Evolutionary Algorithm <i>Ivan Reinaldo Meneghini, Frederico Guimarães, António Gaspar-Cunha and Miri Weiss Cohen</i>
43	Dealing with crossover bias in bi-objective problems <i>Jean P. Martins and Alexandre C. B. Delbem</i>
46	A neuroevolutionary approach to feature selection using multiobjective evolutionary algorithms <i>René Souza Pinto, Maria Fernanda P. Costa, Lino A. Costa and Antonio Gaspar-Cunha</i>

## Saturday, September 14

10.30 11.50	<b>ROOM 1</b>
<b>Paper ID</b>	<b>MS06 - EMO - Evolutionary Multi-Objective Optimization Session 2 - Chairs: Alexandre Delbem and Frederico Guimarães</b>
40	Linear Subspaces Paradigm: An Investigation on a Novel Paradigm for Optimizing Deep Neural Networks <i>Lia Parsenadze, Danilo Vargas and Toshiyuki Fujita</i>
50	Multi-objective optimization in the build orientation of a 3D CAD model <i>Marina A. Matos, Ana Maria A.C. Rocha, Lino Costa and Ana I. Pereira</i>
62	Design of the Pareto-Optimal Frontier Applied into Fog Computing using Sensors Networks for the Development of a Methodology based on Multi-Criteria Decision-Making Algorithms <i>Antonio Marcos Almeida Ferreira, Júlio Cezar Estrella and Alexandre Cláudio Botazzo Delbem</i>
63	Ensemble correlation techniques automates an integrated analysis method for productive networks <i>Heber Lombardi de Carvalho, Fábio Müller Guerrini and Alexandre Delbem</i>

## Friday, September 13

10.30 11.50	ROOM 2
Paper ID	<b>MS07 - Optimization under Uncertainty Session A - Chair: Domenico Quagliarella</b>
41	Robustness Measures for Multi-Objective Robust Design <i>Lisa Kusch and Nicolas Gauger</i>
59	Resilience Engineering for the Design Process of Complex Systems <i>Gianluca Filippi and Massimiliano Vasile</i>
1	Gradient-Based Aerodynamic Shape Robust Optimization using the Adjoint Method and Gaussian Processes <i>Christian Sabater and Stefan Goertz</i>
45	Primal-dual aggregation method for robust aerodynamic design optimization <i>Emre Özkaya and Nicolas Gauger</i>

## Saturday, September 14

10.30 11.50	ROOM 2
Paper ID	<b>MS07 - Optimization under Uncertainty Session B - Chair: Nicolas Gauger</b>
4	A deterministic approach for shape and topology optimization under uncertain loads <i>Chetra Mang, Julien Cortial, Chiara Nardoni and Felipe Bordeu</i>
15	Gradient Based Empirical Cumulative Distribution Function Approximation for Robust Aerodynamic Design <i>Elisa Morales Tirado, Domenico Quagliarella, Andrea Bornaccioni, Umberto Iemma and Renato Tognaccini</i>
8	A Single-Loop Reliability-based Design Optimization Method using Iteratively Updating Hessian <i>Raktim Biswas and Deepak Sharma</i>
51	Surrogate based shape optimization under uncertainty of the ERCOFTAC pump <i>Remo De Donno, Alessia Fracassi, Antonio Ghidoni and Pietro Marco Congedo</i>

## Friday, September 13

10.30 11.30	<b>ROOM 4</b>
<b>Paper ID</b>	<b>MS8 - Numerical simulation as a tool in product development for the industry</b> <b>MS9 - Design of polymer processing equipment: numerical simulation and optimization</b> <b>Chair: Ivan Gajdoš</b>
54	Neuroevolutionary Multiobjective Optimization of Injection Stretch Blow Molding Process in the Blowing Phase <i>Renê Souza Pinto, Hugo M. Silva, Fernando Duarte, Joao Pedro Nunes and Antonio Gaspar-Cunha</i>
66	Simulation of Vacuum Assisted Resin Infusion (VARI) process for the production of composite material parts <i>Joana Malheiro and Pedro Nunes</i>
75	3D Finite Elements Simulation of the Single Screw Extruder with Rotational Barrel Segment <i>Ivan Gajdoš, Janusz Sikora, Ľudmila Dulebová and Ján Varga</i>

## Saturday, September 14

10.30 12.10	<b>ROOM 3</b>
<b>Paper ID</b>	<b>MS11 - Game Theory and Optimization: From Theory to Applications</b> <b>Chairs: Jacques Periaux and David Greiner</b>
26	Multiobjective Optimal Design and Maintenance for Systems based on Calendar Times <i>Andres Cacereño, Blas Galván and David Greiner</i>
37	A Study of Nash Genetic Algorithms for the Minimization of Constrained Weight in Frame Structures: About Mutation Rate <i>David Greiner, Jacques Periaux, José María Emperador, Blas Galván and Gabriel Winter</i>
16	Optimization hybridization with multiple populations and optimization methods <i>Jordi Pons-Prats, Martí Coma and Gabriel Bugea</i>
71	Hybridized Stackelberg game - EAs solutions for the preliminary design optimisation of a hypersonic 2-D airbreathing vehicle <i>Zhili Tang and Jacques Periaux</i>

Friday, September 13

15.10 17.10	Hall
<b>Paper ID</b>	<b>Posters Session</b> <b>Chair: Jacques Periaux</b>
60	Literacy about the waste management in emboarded Staff <i>M. Filomena Teodoro</i>
23	Many-objective Multidisciplinary Evolutionary Design for Hybrid-wing-body-type Flyback Booster on an Entirely Automated System <i>Taiki Hatta, Masataka Sawahara and Kazuhisa Chiba</i>
55	Multi-objective Design Space Exploration using Genetic Algorithms <i>Bernardo Rodrigues and Alexandre Delbem</i>
72	A Numerical Analysis of the Screw of an Extruding Press for Polymer Materials <i>Hubert Dębski and Paweł Wysmulski</i>
77	Numerical analysis of the coupled thermal-stress strength of the active grooved feed zone in an innovative extruder for plastics <i>Miroslaw Ferdynus</i>
47	Fluid simulation by a multi-resolution particle method and its applications <i>Kazuya Shibata, Daisuke Yamada, Takuya Matsunaga and Issei Masaie</i>