



THE EULER NEWSLETTER



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EULER Summer School 2013 Graph and routing dynamics: models and algorithms

<http://summerschool2013.ccaba.upc.edu>

Barcelona (Spain) – July 1-5, 2013

The main objective of the EULER exploratory research project is to investigate new routing paradigms so as to design, develop, and validate experimentally a distributed and dynamic routing scheme suitable for the Internet and its evolution. The foundational principles of the Internet routing system are i) distribution of computation and decision, ii) adaptivity to dynamics, and iii) policing. In distributed routing, each node part of the routing system implements a routing function that computes for any reachable destination

name a loop-free routing path so that incoming messages directed to a given destination can reach it. Adaptive routing refers to the capacity of the routing system to adapt/react in a timely and cost-effective manner when internal or external events occur that affects its value delivery (e.g. add/remove link or node or network failures). The ability to support arbitrary non-technical constraints and/or decisions/rules (driven by cost minimization, profit/revenue maximization, etc.) is also referred to as policing. In summary, routing is an essential function of the Internet.

In recent years there has been substantial research activity in the network science, motivated by a number of new results, both theoretical and applied. The pioneering studies of Watts and Strogatz have been instrumental. Their key observation was that most real networks such as the Internet have mathematical properties that set them apart from regular lattices (high clustering and large diameter) and from random graphs (low clustering and small diameter). The topological structure of these networks (high clustering and small diameter) has a marked influence on processes like routing that may take place on it. Any research initiatives in the Internet routing system is therefore expected now to rely on multi-disciplinary area to architect and design a scalable, distributed, and dynamic routing paradigm.

This objective is considered by the scientific and technical community as one of the major Internet challenges. In this direction, EULER (<http://www.euler-fire-project.eu>) organises the EULER Summer School (EULERSS'13) entitled "Graph and routing dynamics: models and algorithms", which will be held at the Universitat Politècnica de Catalunya premises (<http://www.upc.edu>), in Barcelona, Spain, on July 1-5, 2013. This intensive Summer School aims at presenting current Internet routing system, including its foreseen evolution and covers fundamental aspects such as algorithmic graph theory, graph dynamic modellings and routing models and algorithmics. EULERSS'13 is addressed to MSc, PhD and Post-Docs but also researchers with interests in the topics addressed in the courses as well as proficiency in English. It is worth mentioning that its courses and lectures aim at providing an excellent preparation for entering a PhD in Computer Science.

The goal of this summer school is i) to stimulate research in the interdisciplinary area that lies at the intersection of algorithmic graph theory, distributed routing algorithmic and network dynamics modeling, and ii) to provide a forum for active discussions among teachers/researchers and students.

Organizing Committee

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Venue and accommodation

The EULERSS'13 will be held in Barcelona on July 1-5, 2013. The conference will take place in the Campus Nord of the Universitat Politècnica de Catalunya in the "Aula Magna" of the A3 Building. Address: Jordi Girona 1-3, 08034 Barcelona, Catalonia, Spain.

Barcelona is a cosmopolitan city establishing a bond with other cultures and producing a history marked by diversity. Magnificent examples of artistic trends throughout the ages can be found here providing a great Romanesque, Gothic and above all Modernista legacy, the latter represented by the work of architectural genius Antoni Gaudí.

UPC has special rates at a number of hotel chains for visitors. Below you will find a list of these hotels and all the information you need to make a reservation, including the reservation form.

http://summerschool2013.ccaba.upc.edu/travel_stay

Registration

Attendees must follow the registration guidelines available at <http://summerschool2013.ccaba.upc.edu/registration>
 Registration fee is only 150 € and includes: attendance to all lectures, summer school materials, coffee breaks, lunches, and social events.
 Registration is open until **June 15, 2013**.

Paper submission

Students are encouraged to submit short description of their work. All submissions must be written in English with a maximum of 2 single-column pages (10 point font) including references and figures.

The submissions are not mandatory but highly recommended. All submitted papers will be presented during the Summer School. The Wednesday afternoon will be dedicated to selected presentations among students' submissions (selected by the teachers and organizers of the school). The rest of papers will be presented in form of posters.

This is a great opportunity for students to discuss their researchers altogether and take benefits of the presence of renowned teachers and researchers.

Submission: <http://summerschool2013.ccaba.upc.edu/submissions/>
 Submission of short papers: **June 15, 2013**

Notification of selected papers for oral presentation: **June 25, 2013**

Subscribe to electronic EULER newsletter: <https://sympa.inria.fr/sympa/info/euler-news>

Agenda

EULERSS'13 consists of 10 courses (of 3 hours each) organised in 4 sessions:

- Session 1: Internet routing system.
- Session 2: Algorithmic graph theory.
- Session 3: Dynamic graph modelling.
- Session 4: Routing models and algorithms.

Daily schedule:

- Morning course (1/2): 1h30
- Coffee Break: 0h30
- Morning course (2/2): 1h30
- Lunch: 1h00
- Afternoon course (1/2): 1h30
- Coffee Break: 0h30
- Afternoon course (2/2): 1h30

July 1, 2013 (Monday): Internet routing system

The purpose of this day is to expose the students to the foundations of Internet architecture and its routing system. As well, students will acquire knowledge on the latest research results.

- 08.00 Welcome to the Summer School**
Attendees can pick up the registration materials
- 09.30 Internet routing system and its protocols**
Oliver Bonaventure
Université Catholique de Louvain, Belgium
- 14.00 Advances in routing models and algorithms**
Dimitri Papadimitriou
Alcatel-Lucent, Belgium

July 2, 2013 (Tuesday): Algorithmic graph theory

The focus of this day is on understanding basic properties of graphs introducing most of the classical concepts of pure and applied graph theory. In addition, the use of effectively algorithmic techniques for various optimisation problems on graphs will be presented and practical application discussed.

- 09.30 Foundations of algorithmic graph theory**
Martin Charles Golumbic
University of Haifa, Israel
- 14.00 Advances in algorithmic graph theory**
Yannis Manoussakis
Laboratoire de Recherche en Informatique, France

Forthcoming EC and FIRE events

Future Network & Mobile Summit 2013 http://www.futurenetworksummit.eu/2013/ Lisbon, Portugal	03-05/07/2013
Digital Enlightenment Forum http://www.digitalenlightenment.org/ Brussels, Belgium	18-20/09/2013
ICT 2013 "Create Connect Grow" http://ec.europa.eu/digital-agenda/en/ict-2013 Vilnius, Lithuania	06-08/11/2013

EULER related publications

- D. Papadimitriou, D. Careglio, F. Tarissan, P. Demeester, "Relationship between path-vector routing and forwarding path stability", in Proc. 9th DRCN 2013, Budapest, Hungary, March 2013
- C. Gavoille, C. Glacet, N. Hanusse, D. Ilcinkas, "Algorithme distribué de routage compact en temps optimal", 15th AlgoTel, Pornic, France, May 2013
- F. Giroire, M. Remigiusz, N. Nisse, and S. Pérennes, "Maintaining balanced trees for structured distributed streaming systems", Research Report RR-8309, 2013.

July 3, 2013 (Wednesday): Graph dynamics modelling

One of the geometric properties of graphs underlying large-scale topologies (such as the Internet) is the hyperbolic nature of its topology, useful to enable navigation/routing. The main goal of this course is to understand this branch of graph theory in order to exploit its potential.

08.30 Hyperbolicity and Gromov hyperbolic graphs

José Maria Rodríguez García
Universidad Carlos III de Madrid, Spain

13.00 Advances in algorithmic graph theory

George B. Mertzios
Durham University, United Kingdom

July 4, 2013 (Thursday): Routing models and algorithms - 1

The topological structure of a network has particular mathematical properties that set them apart from random graphs. The courses of this fourth day focus on these properties of a network that marked influence on the processes (e.g. routing) that may take place on it.

09.30 Evolving and small worlds/scale-free networks

Francesc Comellas
Universitat Politècnica de Catalunya, Spain

14.00 Geometric routing schemes

Marian Boguñá
University of Barcelona, Spain

July 5, 2013 (Friday): Routing models and algorithms - 2

The last day of the summer school focuses on two different yet complementary routing areas. The first course deal with the routing problem in the new concept of Information-Centric Network (ICN) which aims to evolve the Internet from today's host-centric to information-centric. The second course focuses on mathematical programming, combinatorial optimisation as well as graph and networks models for some routing problems.

08.30 Information routing schemes

Georges C. Polyzos
Athens University of Economics and Business, Greece

12.30 Operational research aspects in routing

Paola Festa
University of Naples, Italy

Call for papers

22nd ITC Sem. Energy efficient & green networking 02/06/2013 http://www.itcspecialistseminar22.com/ November 20-22, 2013, Christchurch, New Zealand	
9th ACM Int. Conf. CoNext 10/06/2013 http://conferences.sigcomm.org/co-next/2013/ December 9-12, 2013, Santa Barbara (CA), USA	
24th Int. Symp. Algorithms & Computation (ISAAC) 15/06/2013 http://www.cs.hku.hk/isaac2013/ December 16-18, 2013, Hong Kong	
17th Int. Conf. OPODIS 23/06/2013 http://opodis2013.inria.fr/ December 16-18, 2013, Nice, France	
Int. Conf. Comp. Netw. Commun. Netw. (ICNC) 05/07/2013 http://www.conf-icnc.org/2014/ February 3-6, 2014, Honolulu (HI), USA	
ACM-SIAM Symp. Discrete Algorithms (SODA) 08/07/2013 http://www.siam.org/meetings/da14/ January 5-7, 2014, Portland (OR), USA	
33rd IEEE Infocom 28/07/2013 http://www.ieee-infocom.org/2014/ April 27-May 2, 2014, Toronto (ON), Canada	