# Experience from Participating in Marie Skłodowska Curie Actions

**Nikos Passas**
Communication Networks Laboratory
Dept. of Informatics and Telecommunications
National and Kapodistrian University of Athens

# MSCA Coordination Experience

CROSSFIRE

**FP7-ITN: Sept 2012 – Aug 2016**

SMART-NRG

**FP7-IAPP: Jan 2014 – Dec 2017**

CASPER
HORIZON2020 - MSCA - RISE Project

**H2020-RISE: Jan 2016 – Dec 2019**

SPOTLIGHT

**H2020-ITN: Jan 2017 – Dec 2020**

# ITN: Innovative Training Networks

| | |
|---|---|
| ITN | • Innovative Training Networks |
| RISE | • Research & Innovation Staff Exchange |
| COFUND | • Co-financing fellowship or doctoral programmes with transnational mobility |
| NIGHT | • European Researchers’ Night |
| IF | • Individual Fellowships |

# ITN: Innovative Training Networks

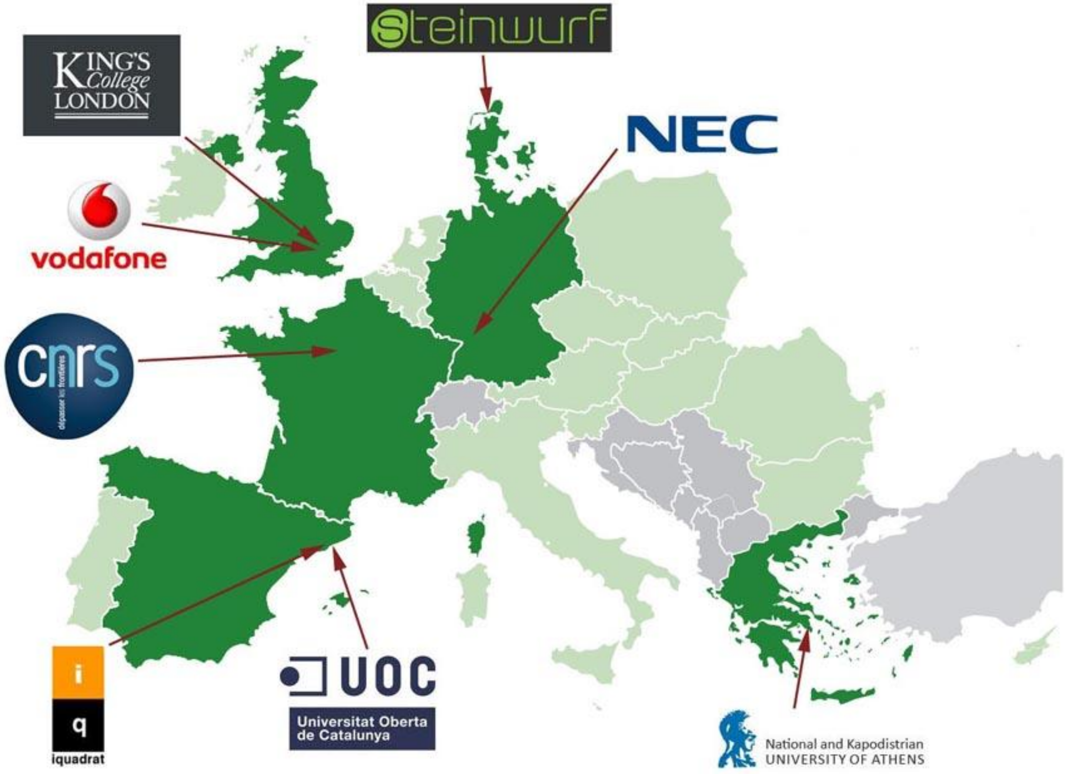
## Quality of Research Training

- Objective: to train a new generation of **creative**, **entrepreneurial** and **innovative** researchers

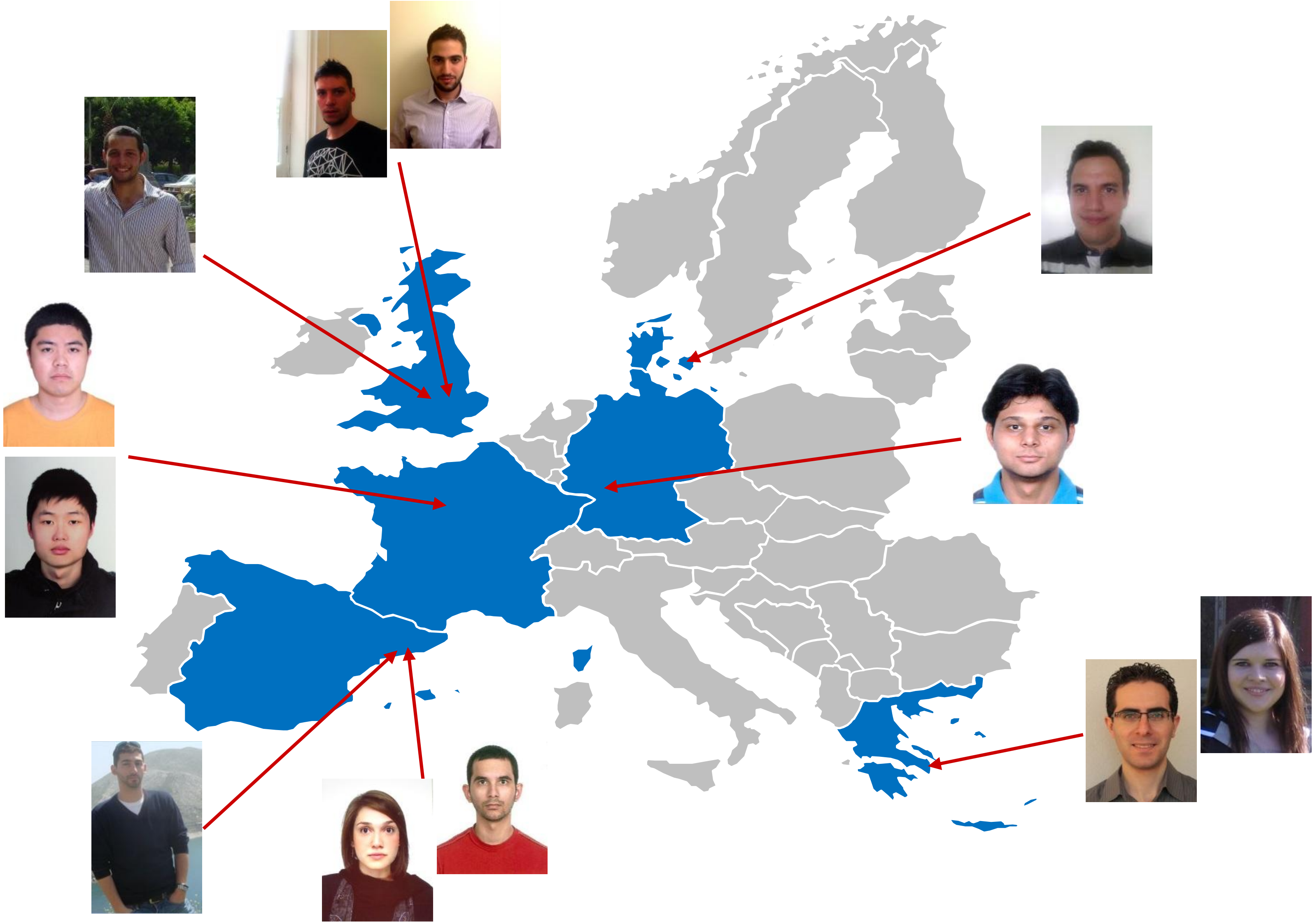
- A Research Training Programme for Early-Stage Researchers (ESRs)
  - Less than 4 years' research experience
  - Not having a PhD
  - Mobility rule applies

# CROSSFIRE at a Glance

Duration: Sep. 2012-Aug. 2016
Funding scheme: FP7-ITN
Effort: 432PM
Total Cost: €3,44M
EC Contribution: €3,44M
Contract Number: 317126


KING'S College LONDON
steinwurf
NEC
vodafone
cnrs
dépasser les frontières
iquadrat
UOC
Universitat Oberta de Catalunya
National and Kapodistrian UNIVERSITY OF ATHENS

# CROSSFIRE – The ESRs



# CROSSFIRE Work Packages

| WP # | WP Type | Work package title | Lead beneficiary | Start month | End month |
|---|---|---|---|---|---|
| WP1 | RTD | **Interference-Aware LTE-A Heterogeneous Wireless Networking** | CNRS | M7 | M48 |
| WP2 | RTD | **Network Virtualization in LTE-A Networks** | NEC | M7 | M48 |
| WP3 | RTD | **Self-Organized and Cognitive LTE-A Networks** | IQU | M7 | M48 |
| WP4 | RTD | **Quality of Experience (QoE) in LTE-A Networks** | UOA | M7 | M48 |
| WP5 | TR | Training | UOC | M1 | M48 |
| WP6 | MGT | Management | UOA | M1 | M48 |
| WP7 | DISS/OUT | Dissemination & Outreach Activities | KCL | M1 | M48 |

# Recruitment Process

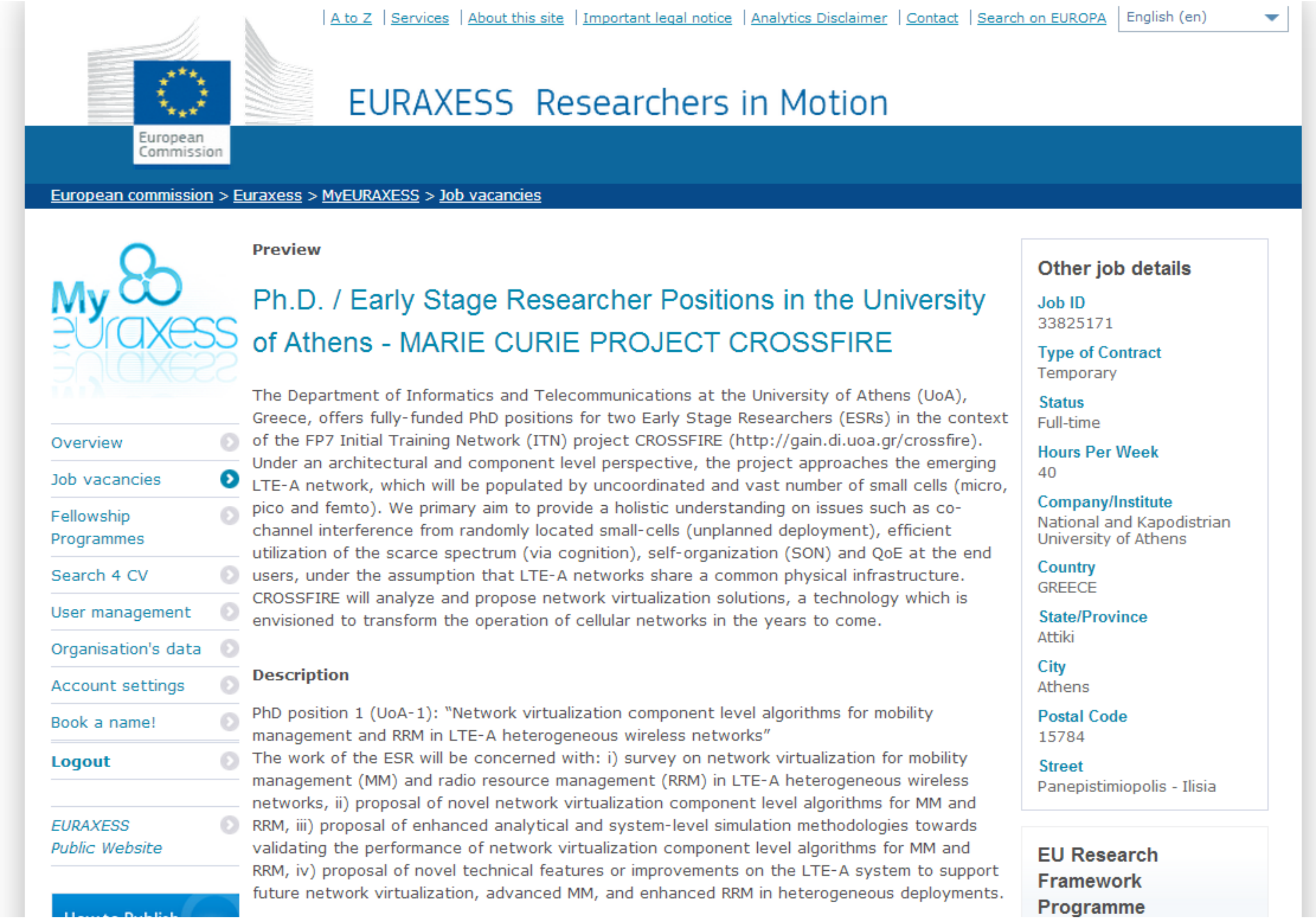
- The submission process was setup electronically (by email to mitn-crossfire@google.com)
- Each submission acknowledged, and assigned a reference number
- The call remained open for 2 months
- An extension was given for a few positions

# Recruitment Process

- A total of 1177 applications were received for all the institutions

- 437 unique applicants (2.69 applications per applicant)

# Advertisement Example


| A to Z | Services | About this site | Important legal notice | Analytics Disclaimer | Contact | Search on EUROPA
English (en)
European Commission
EURAXESS Researchers in Motion
European commission > Euraxess > MyEURAXESS > Job vacancies
My euraxess
Overview
Job vacancies
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Search 4 CV
User management
Organisation's data
Account settings
Book a name!
Logout
EURAXESS Public Website
How to Publish

**Preview**

## Ph.D. / Early Stage Researcher Positions in the University of Athens - MARIE CURIE PROJECT CROSSFIRE

The Department of Informatics and Telecommunications at the University of Athens (UoA), Greece, offers fully-funded PhD positions for two Early Stage Researchers (ESRs) in the context of the FP7 Initial Training Network (ITN) project CROSSFIRE (http://gain.di.uoa.gr/crossfire). Under an architectural and component level perspective, the project approaches the emerging LTE-A network, which will be populated by uncoordinated and vast number of small cells (micro, pico and femto). We primary aim to provide a holistic understanding on issues such as co-channel interference from randomly located small-cells (unplanned deployment), efficient utilization of the scarce spectrum (via cognition), self-organization (SON) and QoE at the end users, under the assumption that LTE-A networks share a common physical infrastructure. CROSSFIRE will analyze and propose network virtualization solutions, a technology which is envisioned to transform the operation of cellular networks in the years to come.

**Description**

PhD position 1 (UoA-1): "Network virtualization component level algorithms for mobility management and RRM in LTE-A heterogeneous wireless networks"
The work of the ESR will be concerned with: i) survey on network virtualization for mobility management (MM) and radio resource management (RRM) in LTE-A heterogeneous wireless networks, ii) proposal of novel network virtualization component level algorithms for MM and RRM, iii) proposal of enhanced analytical and system-level simulation methodologies towards validating the performance of network virtualization component level algorithms for MM and RRM, iv) proposal of novel technical features or improvements on the LTE-A system to support future network virtualization, advanced MM, and enhanced RRM in heterogeneous deployments.

**Other job details**

**Job ID**
33825171

**Type of Contract**
Temporary

**Status**
Full-time

**Hours Per Week**
40

**Company/Institute**
National and Kapodistrian University of Athens

**Country**
GREECE

**State/Province**
Attiki

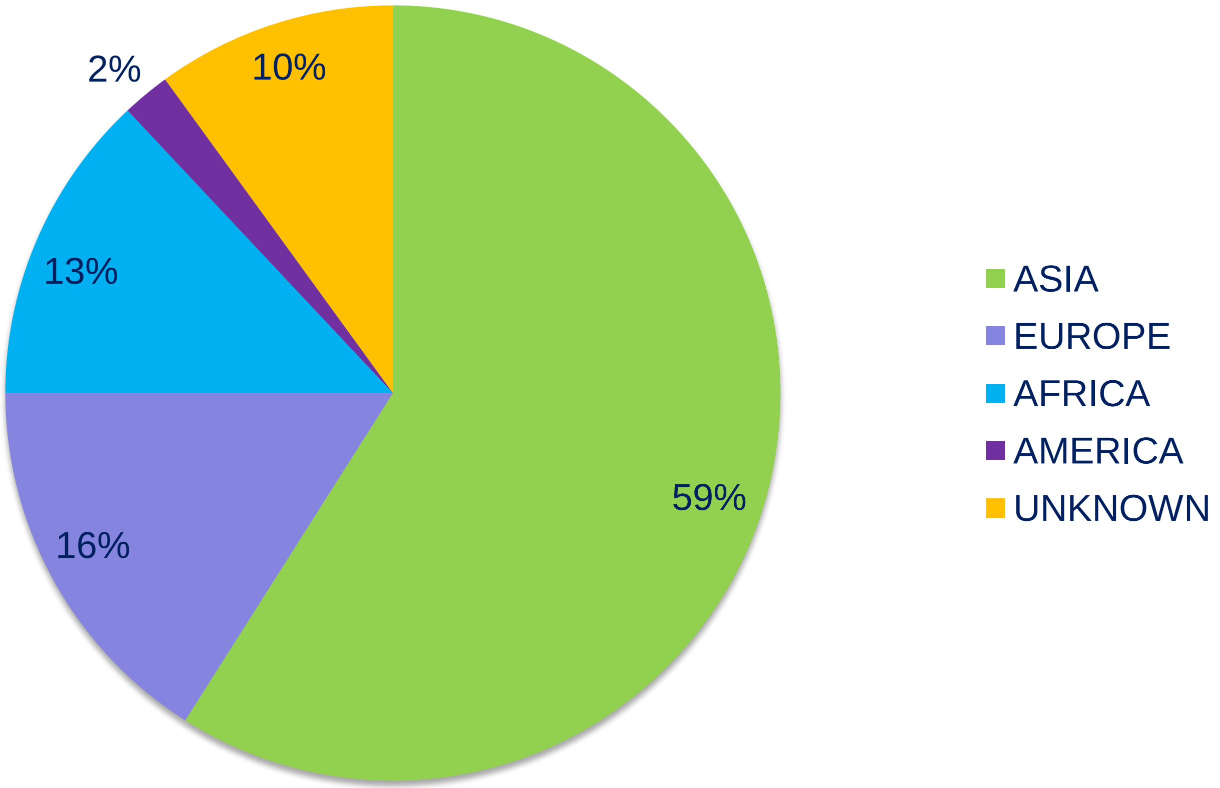
**City**
Athens

**Postal Code**
15784

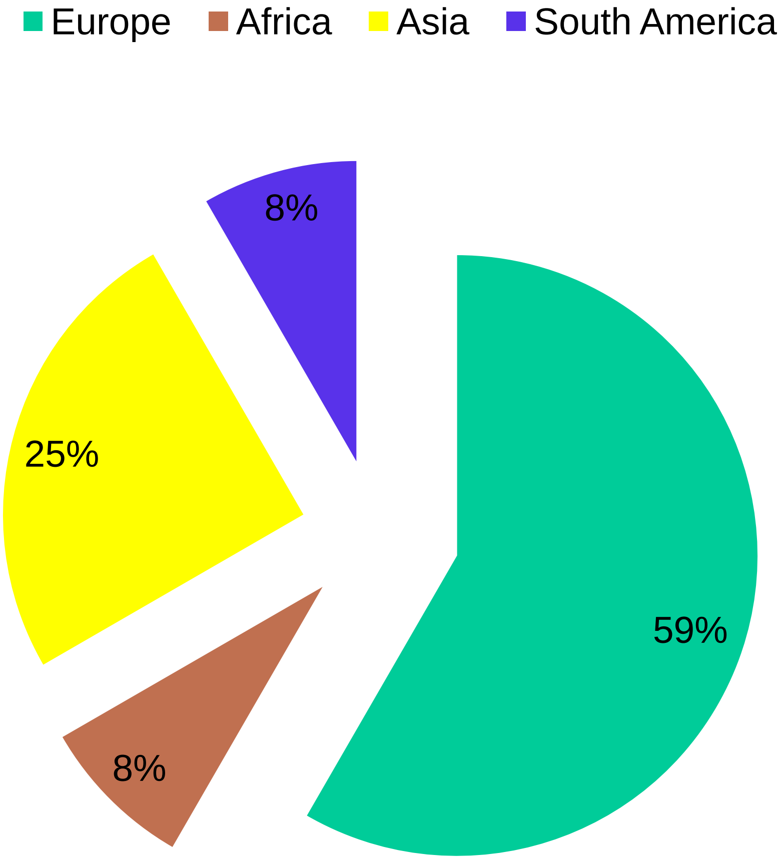
**Street**
Panepistimiopolis - Ilisia

**EU Research Framework Programme**

# % of Applicants from Each Continent



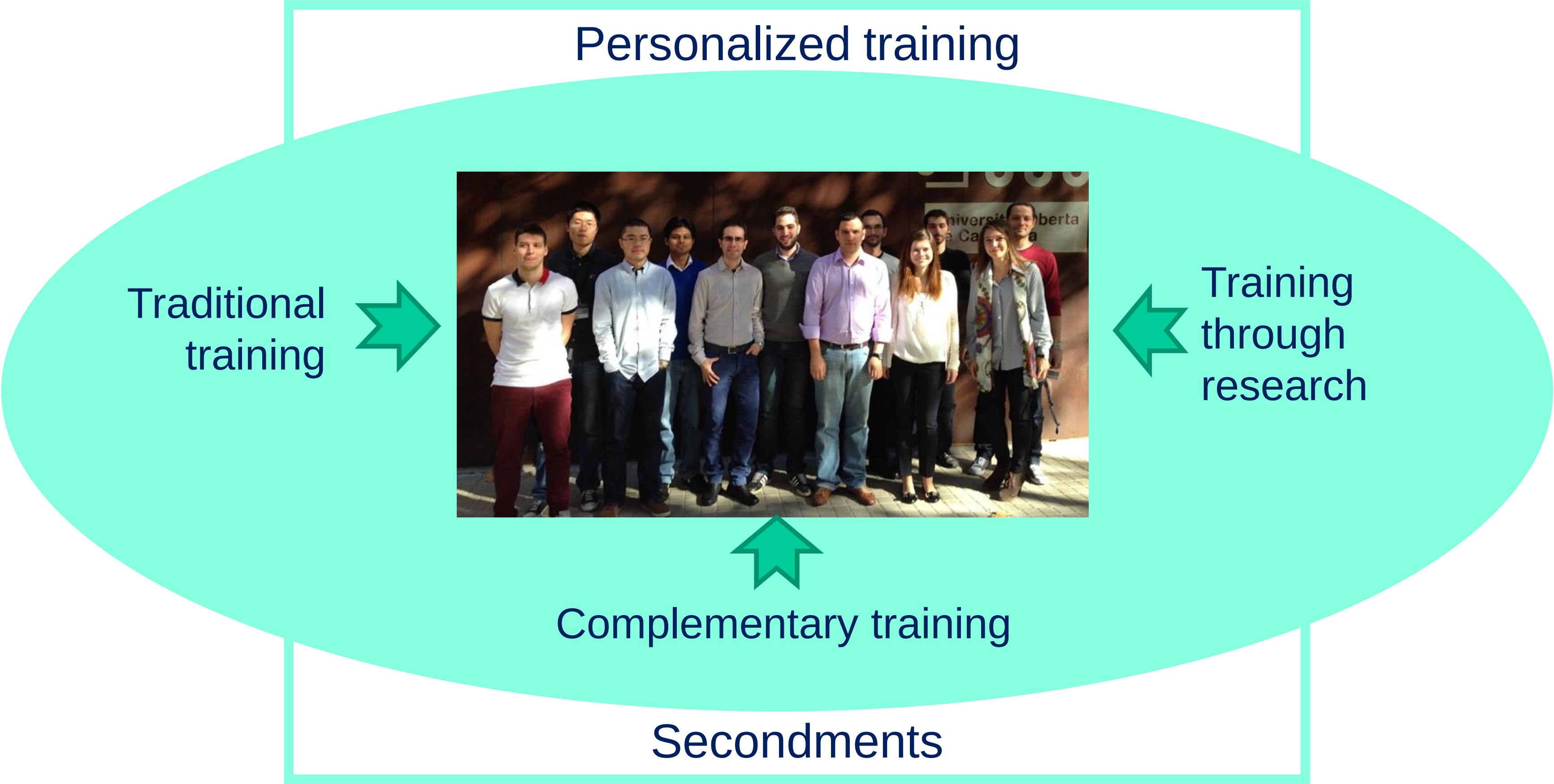
# % of Recruited ESRs per Continent of Residence



# Training Activities

# Training Programme at a glance

- The ESR is placed at the centre of the training programme!



Personalized training

Traditional training

Training through research

Complementary training

Secondments

# Training Activities executed

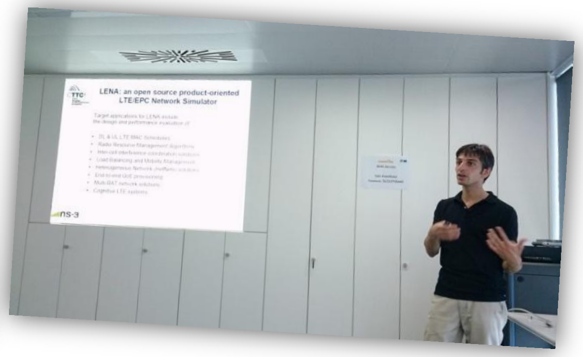
- The training framework included the following activities:
  - Seminars
  - Complementary courses
  - Participation to plenary meetings
  - Local structured PhD courses
  - Co-supervision of Master Theses
  - Secondments
  - Participation to international conferences and workshops
  - Co-organizing two workshops and a final conference

# Seminars

- **Paris, July 3-5, 2013:**
  - **S1: Recent advances in mobile communications.**
    - LTE/LTE-A now and in the future (C. Gruet)
    - Network coding (D. Lucani)
    - Mobility Management for Multitier Cellular Networks: Research Challenges and Modeling (D. Xenakis)
    - Massive MIMO and HetNets: Benefits and Challenges (J. Hoydis)
  - **S4: Network Virtualization for LTE-A networks.**
    - Refactoring Heterogeneous Mobile Networks with SDN: The Road to Network Virtualization (R. Riggio)
    - Mobile Network Virtualization (A. Timm-Giel)
    - Software Defined Networks in WLAN: Challenges and Opportunities (C. Chaudet)
    - Virtualisation and the role of OpenFlow in the Mobile Networks (T. Mahmoodi)

# Seminars

Roberto Riggio on “Refactoring Heterogeneous Mobile Networks with SDN: The Road to Network Virtualization”


LENA: an open source product-oriented LTE/EPC Network Simulator
ns-3

Nicola Baldo on “NS3 and LTE Simulation Tools”

Maria Martini on “Quality of experience measurement & management in wireless multimedia systems”

Alan Law on “Overview on small cell deployments”

Distributed Topology Management
Trade off between energy saving and system performance (Traffic Load)
ABS communicate with adjacent neighbours
Two or four, depending on their positions
CROSSFIRE
THE UNIVERSITY of York

David Grace on “Cognitive Green 5G Wireless Networks – How can Intelligence Save Energy?”

Lindsay Frost on “3GPP –ETSI Overview”

# Complementary Courses

- Heidelberg, March 4-6, 2014:
  - **CC1: Writing scientific papers and patents**
    - Understanding Patents (V. Young)
    - Patent process (V. Young)
    - Finding/Searching for Patents (IPR Team)
    - Standards Essential Patents (J. Swetina)
  - **CC3: Standardization**
    - 3GPP –ETSI Overview (L. Frost and H. van der Vreen)
    - 3GPP RAN (N. Scully)
    - 3GPP-SA2 Architecture (A. Kunz)
    - BBF MBH and Energy Efficiency (K. Samdanis)
    - SDN/ONF Overview (S. Schaller)
    - IETF Overview (J. Quittek)

# Complementary courses

**Marco di Renzo on “Papers Submission, Review Process, Publication Impact and Plagiarism”**

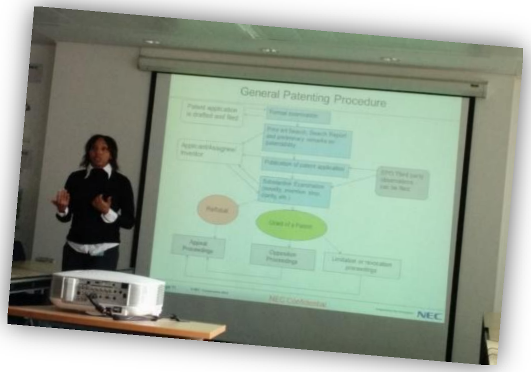
Proposal landscape

**Aygen Kurt-Dickson on “General Tips on Winning Grants”**

UOC
Hands on presentations
The best presentation award

**Hands on Presentations session**

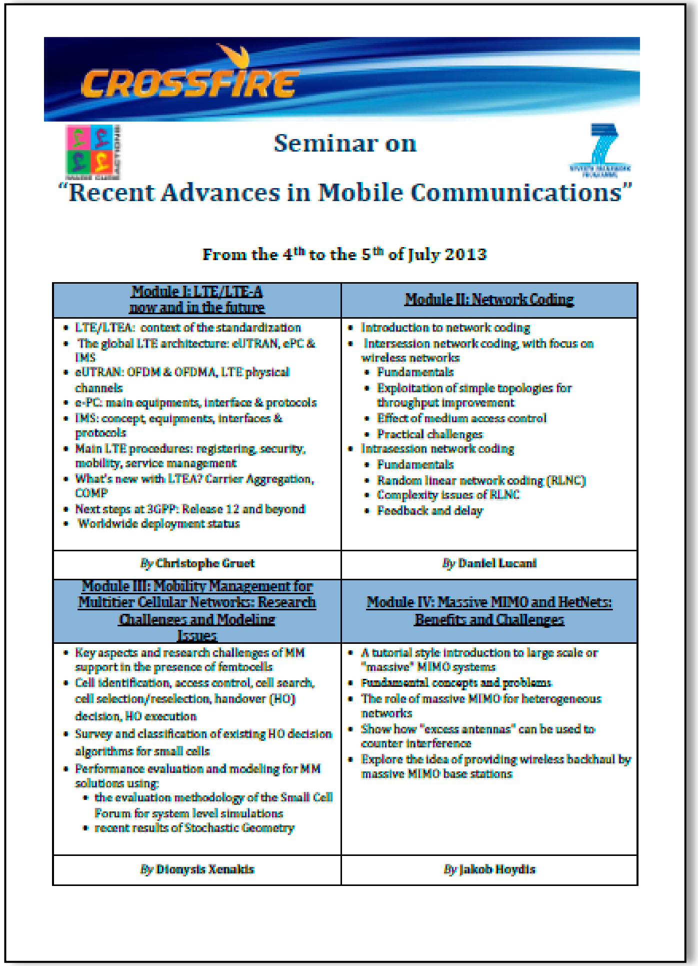
**Maydo Arderiu on “Designing your Personal Marketing Plan to Find your Place in Organizations”**


General Patenting Procedure
NEC

**Veda Young on “Understanding Patents and Patent Process”**

**CROSSFIRE ESRs**

# Seminars and Complementary Courses Leaflets



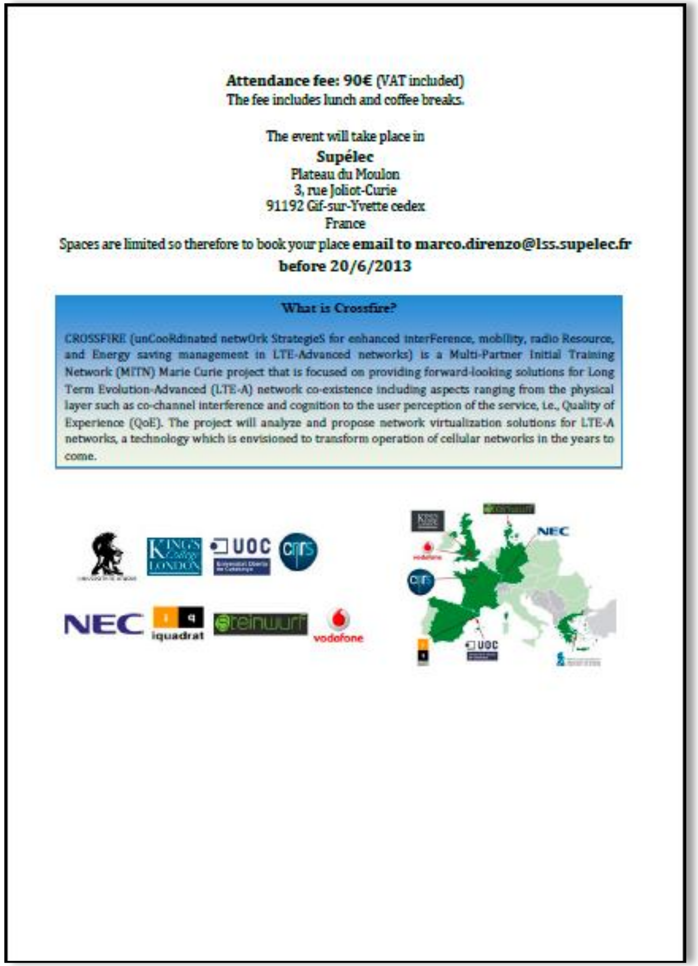
CROSSFIRE

Seminar on

"Recent Advances in Mobile Communications"

**From the 4th to the 5th of July 2013**

| **Module I: LTE/LTE-A now and in the future** | **Module II: Network Coding** |
|---|---|
| • LTE/LTEA: context of the standardization<br>• The global LTE architecture: eUTRAN, ePC & IMS<br>• eUTRAN: OFDM & OFDMA, LTE physical channels<br>• e-PC: main equipments, interface & protocols<br>• IMS: concept, equipments, interfaces & protocols<br>• Main LTE procedures: registering, security, mobility, service management<br>• What's new with LTEA? Carrier Aggregation, COMP<br>• Next steps at 3GPP: Release 12 and beyond<br>• Worldwide deployment status | • Introduction to network coding<br>• Intersession network coding, with focus on wireless networks<br>  • Fundamentals<br>  • Exploitation of simple topologies for throughput improvement<br>  • Effect of medium access control<br>  • Practical challenges<br>• Intrasession network coding<br>  • Fundamentals<br>  • Random linear network coding (RLNC)<br>  • Complexity issues of RLNC<br>  • Feedback and delay |
| *By* **Christophe Gruet** | *By* **Daniel Lucani** |
| **Module III: Mobility Management for Multitier Cellular Networks: Research Challenges and Modeling Issues** | **Module IV: Massive MIMO and HetNets: Benefits and Challenges** |
| • Key aspects and research challenges of MM support in the presence of femtocells<br>• Cell identification, access control, cell search, cell selection/reselection, handover (HO) decision, HO execution<br>• Survey and classification of existing HO decision algorithms for small cells<br>• Performance evaluation and modeling for MM solutions using:<br>  • the evaluation methodology of the Small Cell Forum for system level simulations<br>  • recent results of Stochastic Geometry | • A tutorial style introduction to large scale or "massive" MIMO systems<br>• Fundamental concepts and problems<br>• The role of massive MIMO for heterogeneous networks<br>• Show how "excess antennas" can be used to counter interference<br>• Explore the idea of providing wireless backhaul by massive MIMO base stations |
| *By* **Dionysis Xenakis** | *By* **Jakob Hoydis** |



**Attendance fee: 90€** (VAT included)
The fee includes lunch and coffee breaks.

The event will take place in
**Supélec**
Plateau du Moulon
3, rue Joliot-Curie
91192 Gif-sur-Yvette cedex
France

Spaces are limited so therefore to book your place **email to marco.direnzo@lss.supelec.fr before 20/6/2013**

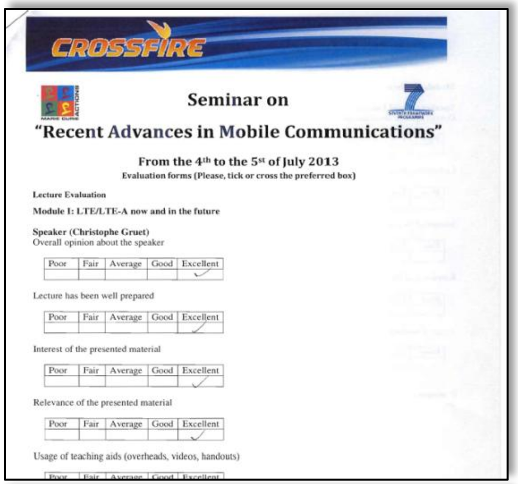
**What is Crossfire?**

CROSSFIRE (unCooRdinated netwOrk StrategieS for enhanced interFerence, mobility, radio Resource, and Energy saving management in LTE-Advanced networks) is a Multi-Partner Initial Training Network (MITN) Marie Curie project that is focused on providing forward-looking solutions for Long Term Evolution-Advanced (LTE-A) network co-existence including aspects ranging from the physical layer such as co-channel interference and cognition to the user perception of the service, i.e., Quality of Experience (QoE). The project will analyze and propose network virtualization solutions for LTE-A networks, a technology which is envisioned to transform operation of cellular networks in the years to come.

# Evaluation Forms

| Questions to ESRs | |
|---|---|
| Q1 | Overall opinion about the speaker |
| Q2 | Lecture has been well prepared |
| Q3 | Interest of the presented material |
| Q4 | Relevance of the presented material |
| Q5 | Usage of teaching aids (overheads, videos, handouts) |

| Questions to speakers | |
|---|---|
| Q1 | Punctuality |
| Q2 | Interaction |
| Q3 | Interest demonstrated during the presentation |
| Q4 | Overall opinion about the ESRs |



CROSSFIRE

Seminar on

"Recent Advances in Mobile Communications"

From the 4th to the 5st of July 2013

Evaluation forms (Please, tick or cross the preferred box)

**Lecture Evaluation**

**Module I: LTE/LTE-A now and in the future**

**Speaker (Christophe Gruet)**

Overall opinion about the speaker

| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|
| | | | | ✓ |

Lecture has been well prepared

| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|
| | | | | ✓ |

Interest of the presented material

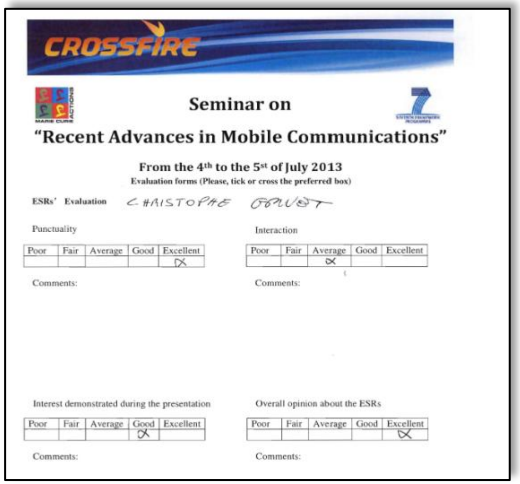
| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|
| | | | | ✓ |

Relevance of the presented material

| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|
| | | | | ✓ |

Usage of teaching aids (overheads, videos, handouts)

| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|



CROSSFIRE

Seminar on

"Recent Advances in Mobile Communications"

From the 4th to the 5st of July 2013

Evaluation forms (Please, tick or cross the preferred box)

**ESRs' Evaluation** CHRISTOPHE GRUET

Punctuality

| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|
| | | | | ☒ |

Comments:

Interaction

| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|
| | | ☒ | | |

Comments:

Interest demonstrated during the presentation

| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|
| | | | ☒ | |

Comments:

Overall opinion about the ESRs

| Poor | Fair | Average | Good | Excellent |
|---|---|---|---|---|
| | | | | ☒ |

Comments:

# Evaluation results

- Lectures' evaluation:

| Questions | Paris | Barcelona | Heidelberg |
|---|---|---|---|
| Overall opinion about the speaker | 4.3 | 4.7 | 4.3 |
| Lecture has been well prepared | 4.3 | 4.7 | 4.3 |
| Interest of the presented material | 4 | 4.6 | 4.2 |
| Relevance of the presented material | 4 | 4.7 | 4.2 |
| Usage of teaching aids (overheads, videos, handouts) | 4 | 4.5 | 3.8 |

- In general, speakers had a good opinion about the ESRs and appreciated their participation and interaction

# Plenary meetings

2nd plenary meeting, Paris, July 2013

3rd plenary meeting, Barcelona, Nov. 2013

4th plenary meeting, Heidelberg, Mar. 2014

Last plenary meeting, London, Nov. 2015

6th plenary meeting, Newbury UK, Feb. 2015

Mid-Term Review, Barcelona, July 2014

# Secondments

- Four months per ESR in another partner (academic to industrial and vice versa)

| Secondments | |
|---|---|
| UOA-1 to VOD (M28) | CNRS-1 to IQU (M25) |
| UOA-2 to UOC (M32) | CNRS-2 to IQU (M33) |
| KCL-1 to UOA (M30) | NEC-1 to UOA (M28) |
| KCL-2 to STEIN (M25) | IQU-1 to KCL (M26) |
| UOC-1 to NEC (M28) | STEIN-1 to CNRS (M26) |
| UOC-2 to KCL (M32) | VOD-1 to UOC (M25) |

# Secondments

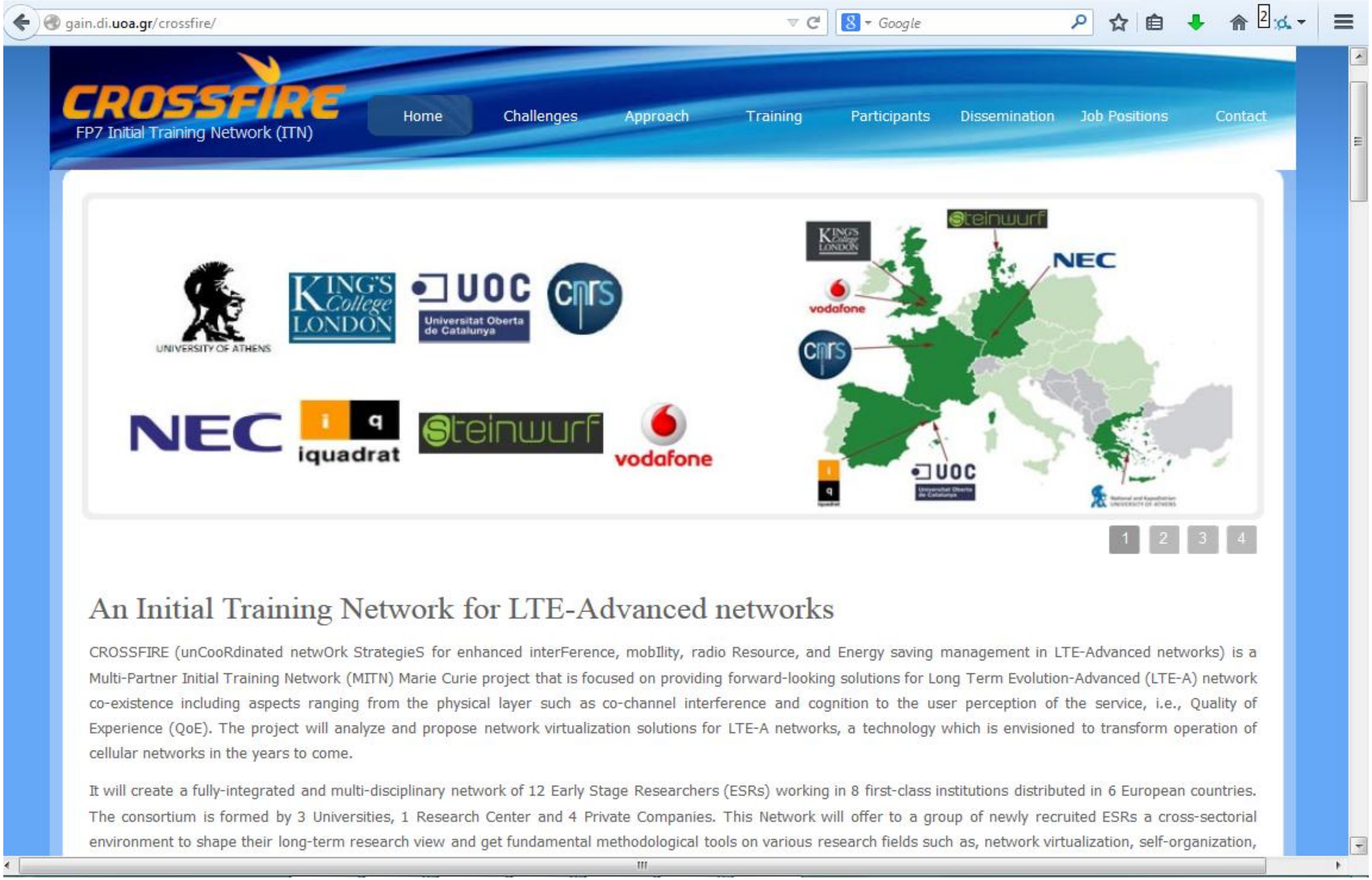
KING'S College LONDON
Strand Campus
Strand Building
Strand
London WC2R 2LS
NEC
ΤΜΗΜΑ ΠΛΗΡΟΦΟΡΙΚΗΣ ΚΑΙ ΤΗΛΕΠΙΚΟΙΝΩΝΙΩΝ
IN3 Internet Interdisciplinary Institute
Formation continue
CentraleSupélec
Bienvenue
Welcome
Accueil
NEC
fairtrade
DATAVARD
NEC Europe Ltd. Mobile Systems
NEC Empfang/Reception
Dr. med. Ishak Taube
FORTUNA Apotheke
Zahnarztpraxis Dr. med. dent. V. Seufert
Vodafone Patents
Always Innovating Technology #Firsts for Vodafone

# Dissemination Activities

# Activities executed

- **Website**
  - Including secure area (wiki) and public area to disseminate results
- **Conference and journal publications**
  - Top scientific journals, magazines and conferences (including demos)
- **Standardization**
  - Driven mainly by large industrial partners
- **Workshops and conference organization**
  - Two workshops and a final conference
- **Industrial dissemination day**
  - Strengthen the collaboration of ESRs with industry

# Website

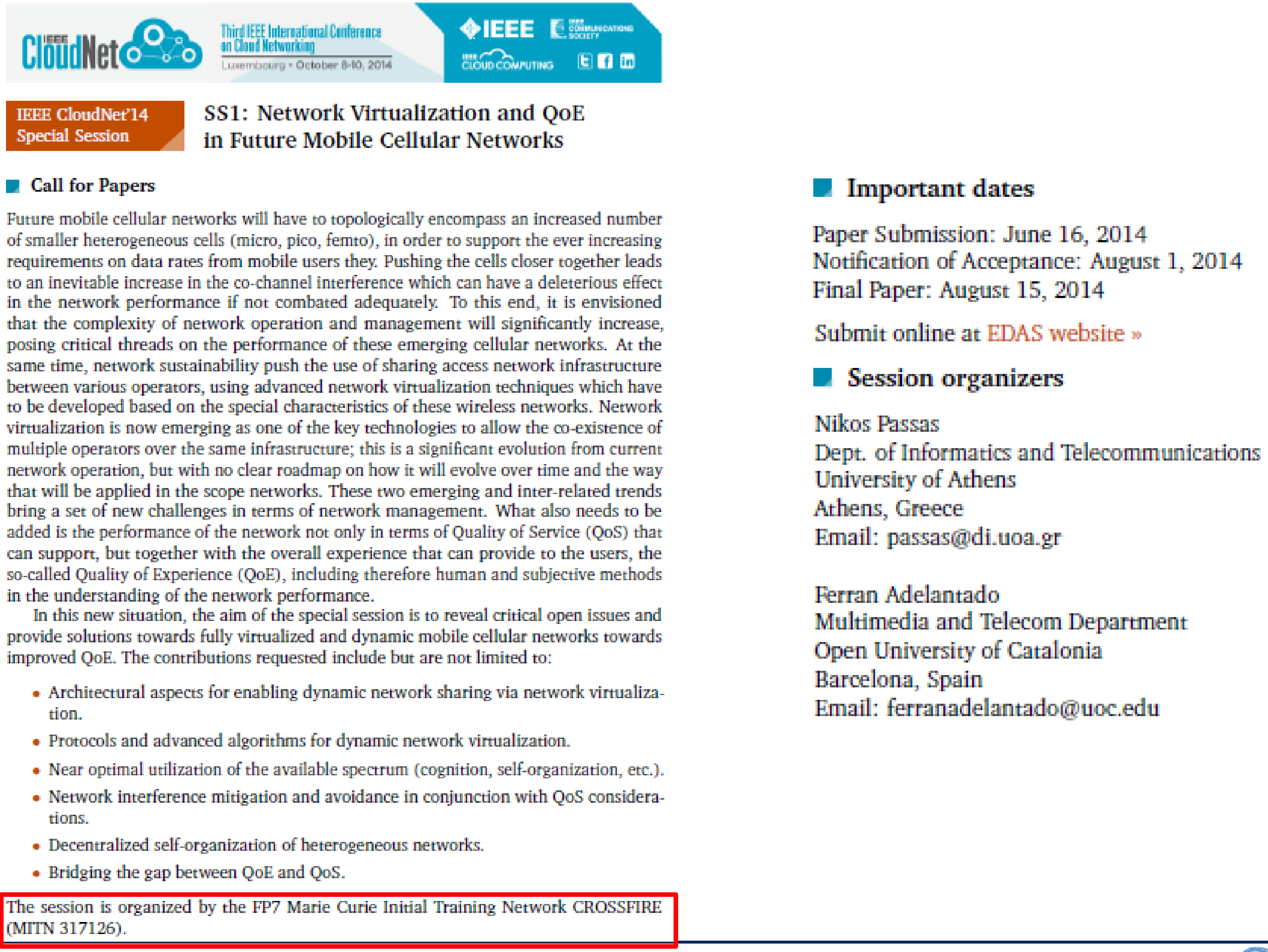

gain.di.uoa.gr/crossfire/
Google
CROSSFIRE
FP7 Initial Training Network (ITN)
Home
Challenges
Approach
Training
Participants
Dissemination
Job Positions
Contact
UNIVERSITY OF ATHENS
KING'S College LONDON
UOC Universitat Oberta de Catalunya
cnrs
NEC
iquadrat
Steinwurf
vodafone
1
2
3
4

## An Initial Training Network for LTE-Advanced networks

CROSSFIRE (unCooRdinated netwOrk StrategieS for enhanced interFerence, mobIlity, radio Resource, and Energy saving management in LTE-Advanced networks) is a Multi-Partner Initial Training Network (MITN) Marie Curie project that is focused on providing forward-looking solutions for Long Term Evolution-Advanced (LTE-A) network co-existence including aspects ranging from the physical layer such as co-channel interference and cognition to the user perception of the service, i.e., Quality of Experience (QoE). The project will analyze and propose network virtualization solutions for LTE-A networks, a technology which is envisioned to transform operation of cellular networks in the years to come.

It will create a fully-integrated and multi-disciplinary network of 12 Early Stage Researchers (ESRs) working in 8 first-class institutions distributed in 6 European countries. The consortium is formed by 3 Universities, 1 Research Center and 4 Private Companies. This Network will offer to a group of newly recruited ESRs a cross-sectorial environment to shape their long-term research view and get fundamental methodological tools on various research fields such as, network virtualization, self-organization,

# First CROSSFIRE Workshop
# A Special Session in IEEE CloudNet2014



IEEE CloudNet

Third IEEE International Conference on Cloud Networking

Luxembourg • October 8-10, 2014

IEEE
IEEE Communications Society
IEEE Cloud Computing

IEEE CloudNet'14 Special Session

## SS1: Network Virtualization and QoE in Future Mobile Cellular Networks

### Call for Papers

Future mobile cellular networks will have to topologically encompass an increased number of smaller heterogeneous cells (micro, pico, femto), in order to support the ever increasing requirements on data rates from mobile users they. Pushing the cells closer together leads to an inevitable increase in the co-channel interference which can have a deleterious effect in the network performance if not combated adequately. To this end, it is envisioned that the complexity of network operation and management will significantly increase, posing critical threads on the performance of these emerging cellular networks. At the same time, network sustainability push the use of sharing access network infrastructure between various operators, using advanced network virtualization techniques which have to be developed based on the special characteristics of these wireless networks. Network virtualization is now emerging as one of the key technologies to allow the co-existence of multiple operators over the same infrastructure; this is a significant evolution from current network operation, but with no clear roadmap on how it will evolve over time and the way that will be applied in the scope networks. These two emerging and inter-related trends bring a set of new challenges in terms of network management. What also needs to be added is the performance of the network not only in terms of Quality of Service (QoS) that can support, but together with the overall experience that can provide to the users, the so-called Quality of Experience (QoE), including therefore human and subjective methods in the understanding of the network performance.

In this new situation, the aim of the special session is to reveal critical open issues and provide solutions towards fully virtualized and dynamic mobile cellular networks towards improved QoE. The contributions requested include but are not limited to:

- Architectural aspects for enabling dynamic network sharing via network virtualization.
- Protocols and advanced algorithms for dynamic network virtualization.
- Near optimal utilization of the available spectrum (cognition, self-organization, etc.).
- Network interference mitigation and avoidance in conjunction with QoS considerations.
- Decentralized self-organization of heterogeneous networks.
- Bridging the gap between QoE and QoS.

The session is organized by the FP7 Marie Curie Initial Training Network CROSSFIRE (MITN 317126).

### Important dates

Paper Submission: June 16, 2014
Notification of Acceptance: August 1, 2014
Final Paper: August 15, 2014

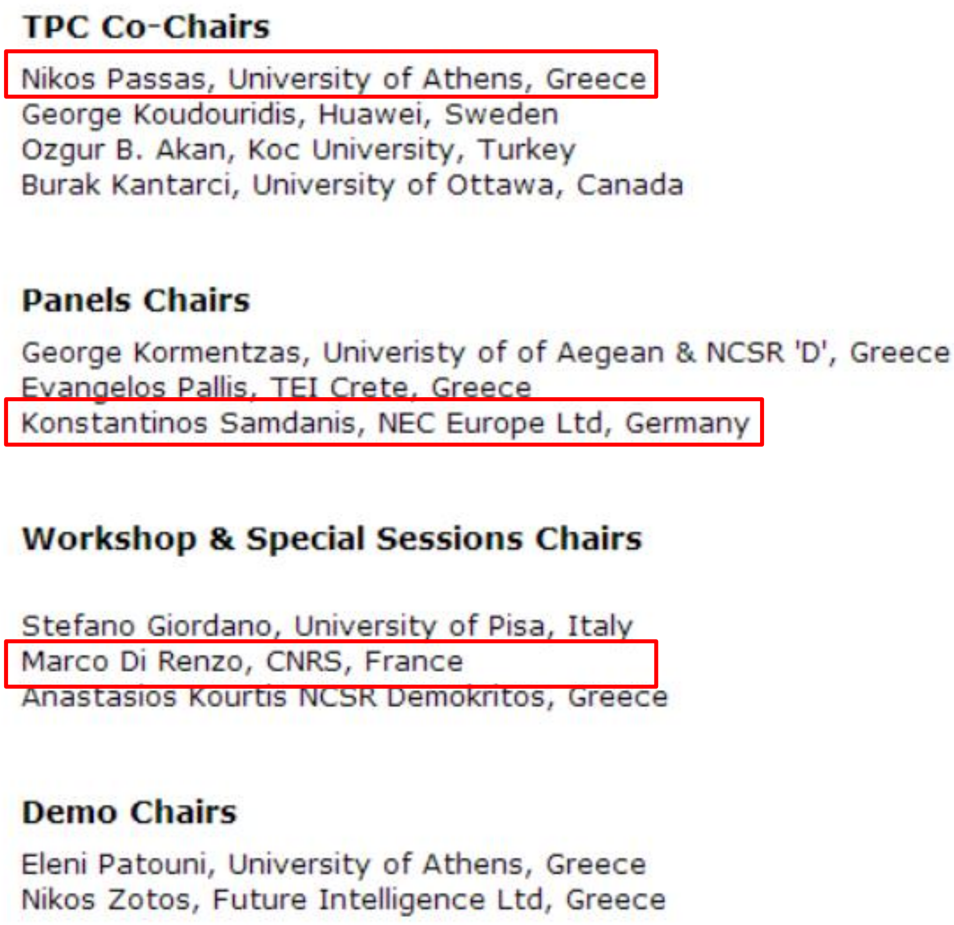
Submit online at EDAS website »

### Session organizers

Nikos Passas
Dept. of Informatics and Telecommunications
University of Athens
Athens, Greece
Email: passas@di.uoa.gr

Ferran Adelantado
Multimedia and Telecom Department
Open University of Catalonia
Barcelona, Spain
Email: ferranadelantado@uoc.edu

# Second CROSSFIRE Workshop
# Co-organization of IEEE CAMAD 2014



**TPC Co-Chairs**

Nikos Passas, University of Athens, Greece
George Koudouridis, Huawei, Sweden
Ozgur B. Akan, Koc University, Turkey
Burak Kantarci, University of Ottawa, Canada

**Panels Chairs**

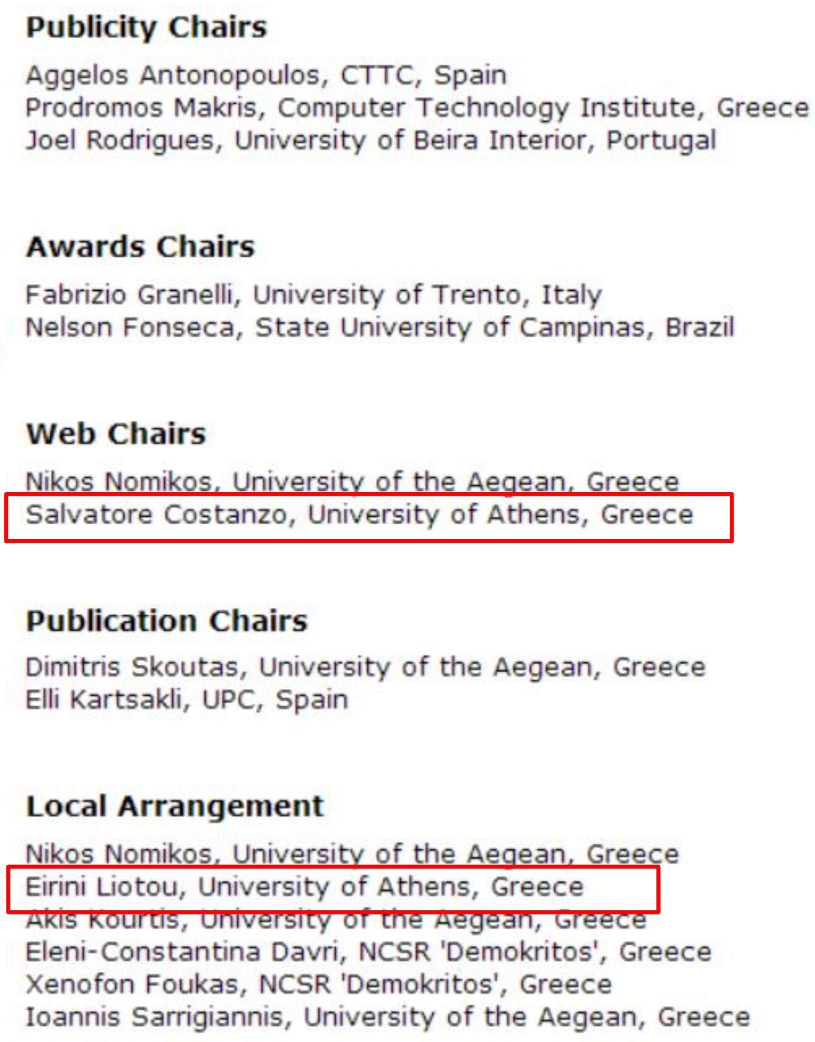
George Kormentzas, Univeristy of of Aegean & NCSR 'D', Greece
Evangelos Pallis, TEI Crete, Greece
Konstantinos Samdanis, NEC Europe Ltd, Germany

**Workshop & Special Sessions Chairs**

Stefano Giordano, University of Pisa, Italy
Marco Di Renzo, CNRS, France
Anastasios Kourtis NCSR Demokritos, Greece

**Demo Chairs**

Eleni Patouni, University of Athens, Greece
Nikos Zotos, Future Intelligence Ltd, Greece



**Publicity Chairs**

Aggelos Antonopoulos, CTTC, Spain
Prodromos Makris, Computer Technology Institute, Greece
Joel Rodrigues, University of Beira Interior, Portugal

**Awards Chairs**

Fabrizio Granelli, University of Trento, Italy
Nelson Fonseca, State University of Campinas, Brazil

**Web Chairs**

Nikos Nomikos, University of the Aegean, Greece
Salvatore Costanzo, University of Athens, Greece

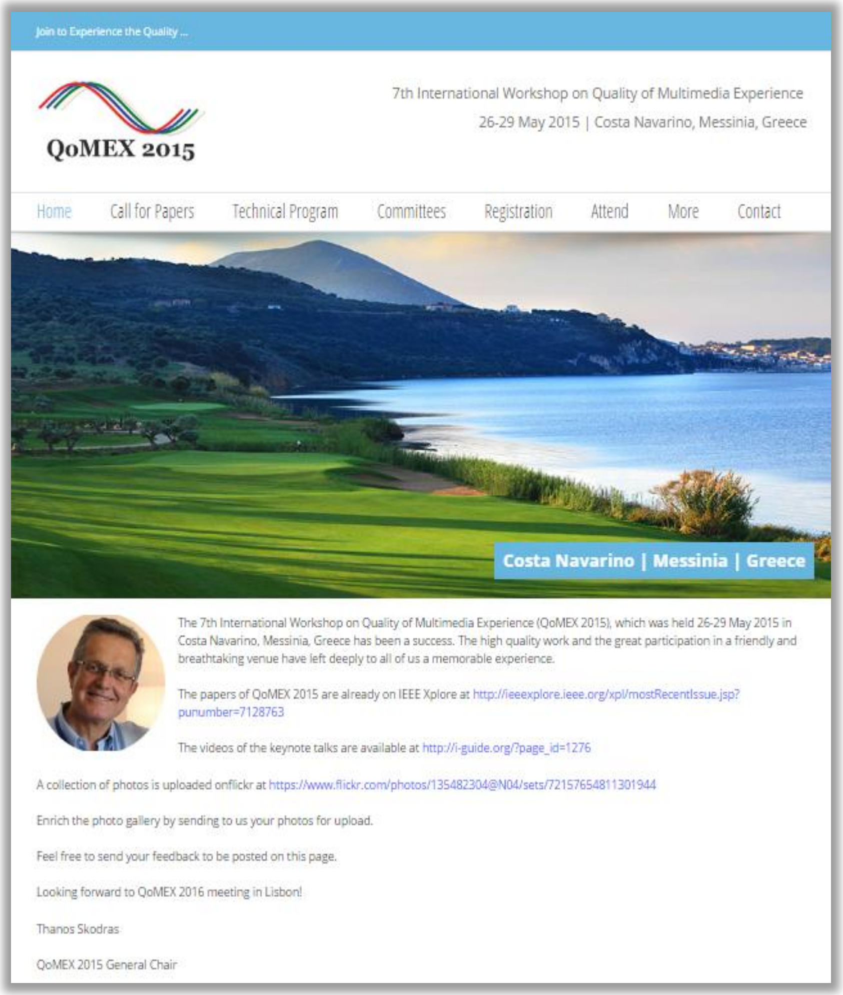
**Publication Chairs**

Dimitris Skoutas, University of the Aegean, Greece
Elli Kartsakli, UPC, Spain

**Local Arrangement**

Nikos Nomikos, University of the Aegean, Greece
Eirini Liotou, University of Athens, Greece
Akis Kourtis, University of the Aegean, Greece
Eleni-Constantina Davri, NCSR 'Demokritos', Greece
Xenofon Foukas, NCSR 'Demokritos', Greece
Ioannis Sarrigiannis, University of the Aegean, Greece

# Final conference - IEEE QoMEX 2015: Special Session on “QoE in 4G mobile networks and beyond”



Join to Experience the Quality ...

QoMEX 2015

7th International Workshop on Quality of Multimedia Experience

26-29 May 2015 | Costa Navarino, Messinia, Greece

The 7th International Workshop on Quality of Multimedia Experience (QoMEX 2015), which was held 26-29 May 2015 in Costa Navarino, Messinia, Greece has been a success. The high quality work and the great participation in a friendly and breathtaking venue have left deeply to all of us a memorable experience.

The papers of QoMEX 2015 are already on IEEE Xplore at http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=7128763

The videos of the keynote talks are available at http://i-guide.org/?page_id=1276

A collection of photos is uploaded onflickr at https://www.flickr.com/photos/135482304@N04/sets/72157654811301944

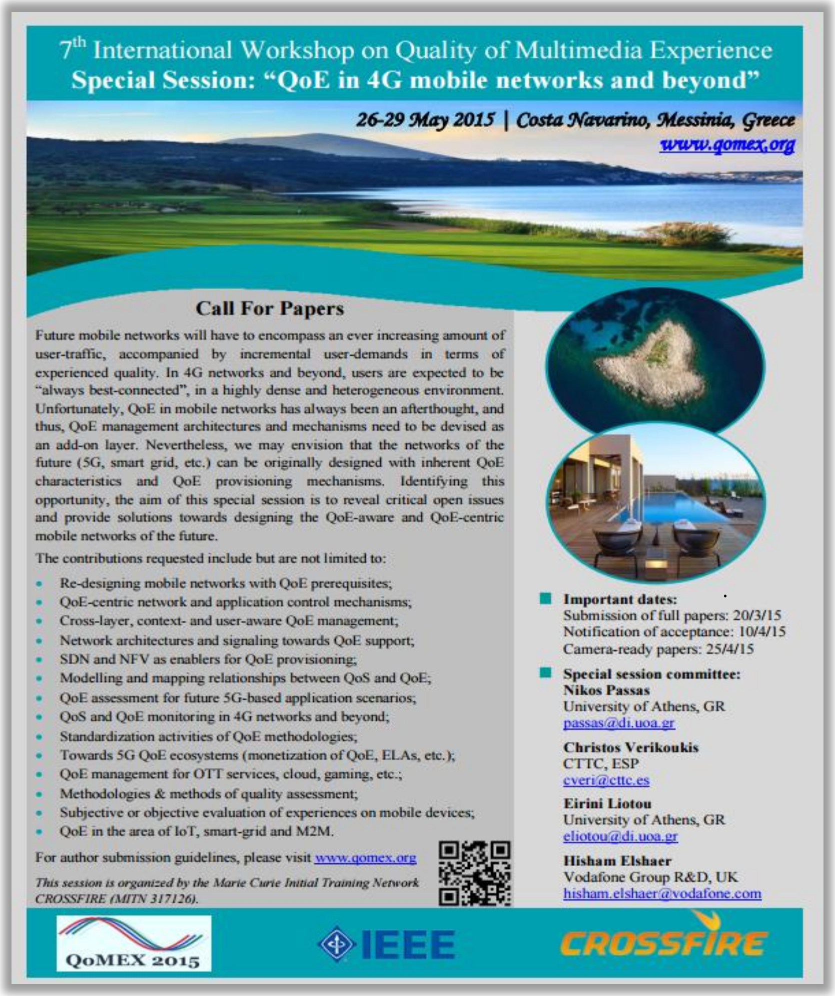
Enrich the photo gallery by sending to us your photos for upload.

Feel free to send your feedback to be posted on this page.

Looking forward to QoMEX 2016 meeting in Lisbon!

Thanos Skodras

QoMEX 2015 General Chair



7th International Workshop on Quality of Multimedia Experience

**Special Session: “QoE in 4G mobile networks and beyond”**

*26-29 May 2015 | Costa Navarino, Messinia, Greece*

*www.qomex.org*

**Call For Papers**

Future mobile networks will have to encompass an ever increasing amount of user-traffic, accompanied by incremental user-demands in terms of experienced quality. In 4G networks and beyond, users are expected to be “always best-connected”, in a highly dense and heterogeneous environment. Unfortunately, QoE in mobile networks has always been an afterthought, and thus, QoE management architectures and mechanisms need to be devised as an add-on layer. Nevertheless, we may envision that the networks of the future (5G, smart grid, etc.) can be originally designed with inherent QoE characteristics and QoE provisioning mechanisms. Identifying this opportunity, the aim of this special session is to reveal critical open issues and provide solutions towards designing the QoE-aware and QoE-centric mobile networks of the future.

The contributions requested include but are not limited to:

- Re-designing mobile networks with QoE prerequisites;
- QoE-centric network and application control mechanisms;
- Cross-layer, context- and user-aware QoE management;
- Network architectures and signaling towards QoE support;
- SDN and NFV as enablers for QoE provisioning;
- Modelling and mapping relationships between QoS and QoE;
- QoE assessment for future 5G-based application scenarios;
- QoS and QoE monitoring in 4G networks and beyond;
- Standardization activities of QoE methodologies;
- Towards 5G QoE ecosystems (monetization of QoE, ELAs, etc.);
- QoE management for OTT services, cloud, gaming, etc.;
- Methodologies & methods of quality assessment;
- Subjective or objective evaluation of experiences on mobile devices;
- QoE in the area of IoT, smart-grid and M2M.

For author submission guidelines, please visit www.qomex.org

*This session is organized by the Marie Curie Initial Training Network CROSSFIRE (MITN 317126).*

- **Important dates:**
  Submission of full papers: 20/3/15
  Notification of acceptance: 10/4/15
  Camera-ready papers: 25/4/15
- **Special session committee:**
  **Nikos Passas**
  University of Athens, GR
  passas@di.uoa.gr

  **Christos Verikoukis**
  CTTC, ESP
  cveri@cttc.es

  **Eirini Liotou**
  University of Athens, GR
  eliotou@di.uoa.gr

  **Hisham Elshaer**
  Vodafone Group R&D, UK
  hisham.elshaer@vodafone.com

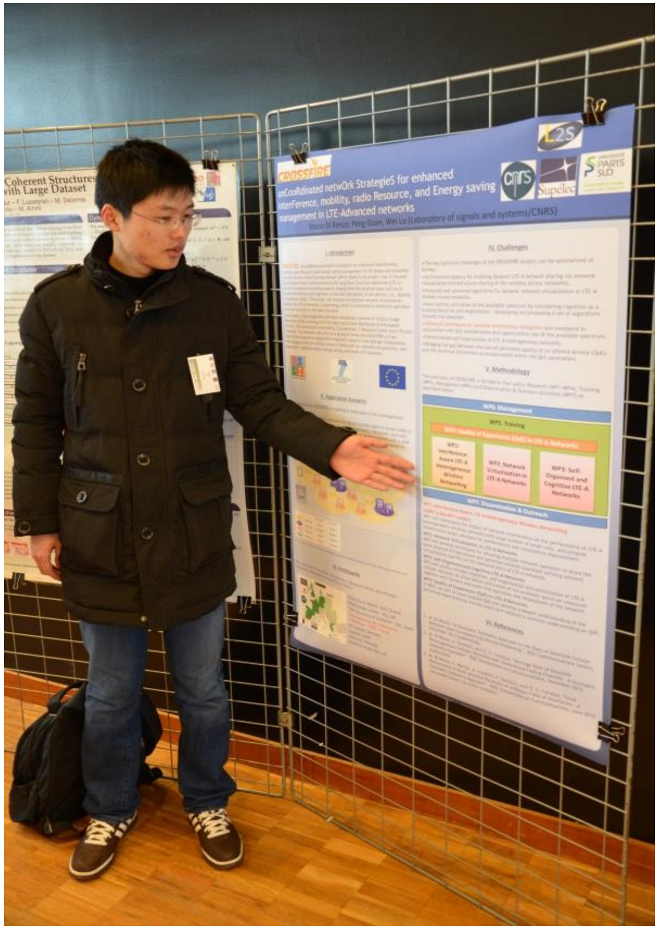
# Outreach Activities

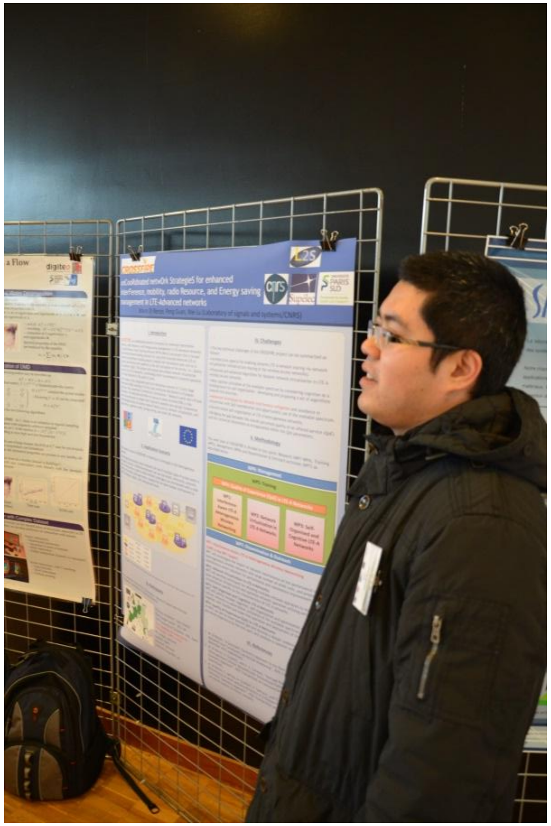
# Activities executed

- **Project open days:** Separate location, public visits, tour at the labs, hands-on experience and lectures.
- **E-Newsletter:** Every 3 months including highlights of project achievements.
- **Social media:** Twitter and Linkedin used to allow direct access to wide audiences.
- **Video clips:** Two video-clips (one in the middle and one close to the end).
- **Public talks:** One public talk per ESR per year.

# 1st Open Day – Part 1

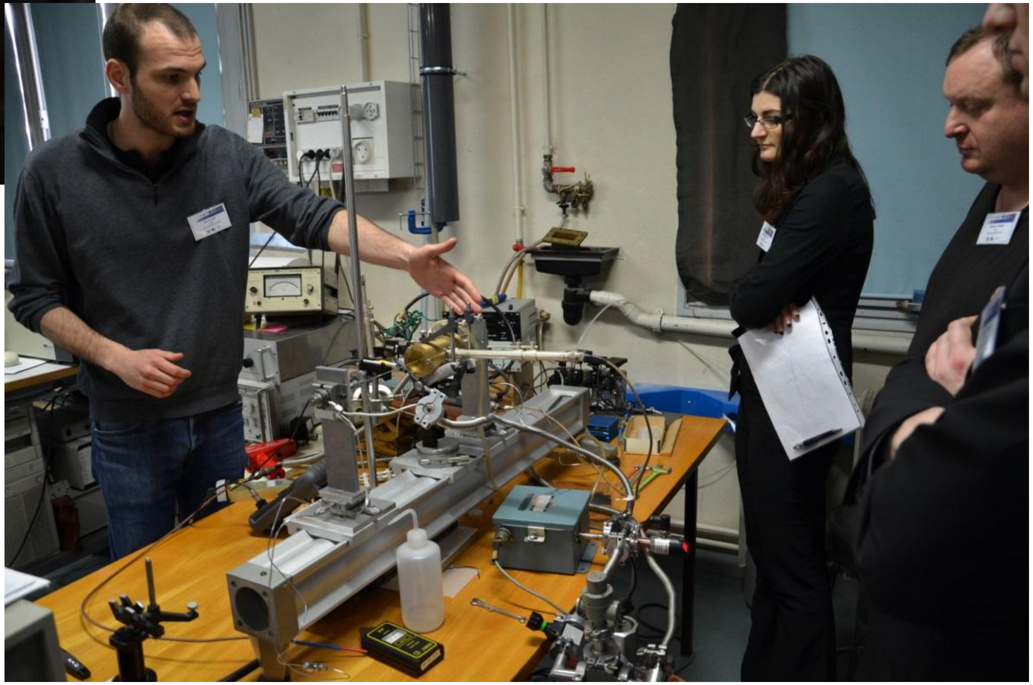
## (18/01/13 Univ. Paris Sud)



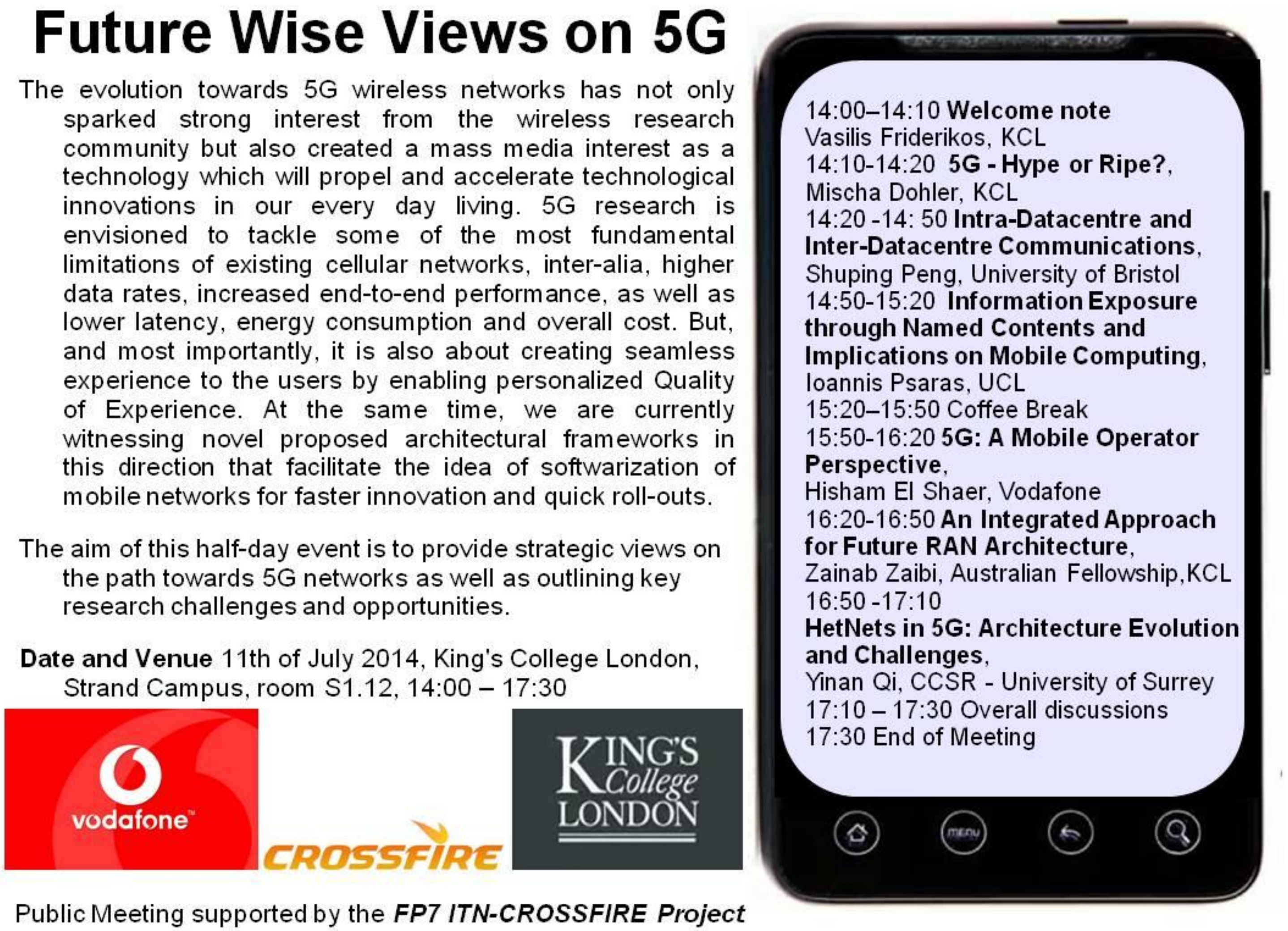


# 1st Open Day – Part 2

## (17/04/13 Univ. Paris Sud)



# 2nd Open Day
## (11/07/14 King’s College London)



### Future Wise Views on 5G

The evolution towards 5G wireless networks has not only sparked strong interest from the wireless research community but also created a mass media interest as a technology which will propel and accelerate technological innovations in our every day living. 5G research is envisioned to tackle some of the most fundamental limitations of existing cellular networks, inter-alia, higher data rates, increased end-to-end performance, as well as lower latency, energy consumption and overall cost. But, and most importantly, it is also about creating seamless experience to the users by enabling personalized Quality of Experience. At the same time, we are currently witnessing novel proposed architectural frameworks in this direction that facilitate the idea of softwarization of mobile networks for faster innovation and quick roll-outs.

The aim of this half-day event is to provide strategic views on the path towards 5G networks as well as outlining key research challenges and opportunities.

**Date and Venue** 11th of July 2014, King's College London, Strand Campus, room S1.12, 14:00 – 17:30

14:00–14:10 **Welcome note**
Vasilis Friderikos, KCL
14:10-14:20 **5G - Hype or Ripe?**,
Mischa Dohler, KCL
14:20 -14: 50 **Intra-Datacentre and Inter-Datacentre Communications**,
Shuping Peng, University of Bristol
14:50-15:20 **Information Exposure through Named Contents and Implications on Mobile Computing**,
Ioannis Psaras, UCL
15:20–15:50 Coffee Break
15:50-16:20 **5G: A Mobile Operator Perspective**,
Hisham El Shaer, Vodafone
16:20-16:50 **An Integrated Approach for Future RAN Architecture**,
Zainab Zaibi, Australian Fellowship,KCL
16:50 -17:10
**HetNets in 5G: Architecture Evolution and Challenges**,
Yinan Qi, CCSR - University of Surrey
17:10 – 17:30 Overall discussions
17:30 End of Meeting

Public Meeting supported by the *FP7 ITN-CROSSFIRE Project*

# 2nd Open Day

## (11/07/14 King's College London)

# E-Newsletters

CROSSFIRE

An Initial Training Network (ITN) for LTE-Advanced Networks

**Newsletter**
**May 2013**
Issue Number 1

**In this issue:**

Project overview 1
Project's partners 1
Recruitment of ESRs 2
Kick-off meeting 3
Latest news 3
Publications 3
Open Days 4
Upcoming events 5
Crossfire in social media 5

## Project overview

CROSSFIRE stands for "uncoordinated network **S**trategie**S** for enhanced inter**F**erence, mob**I**lity, radio **R**esource, and **E**nergy saving management" in Long-Term Evolution-Advanced (LTE-A) networks and it is a Multi-Partner Initial Training Network (MITN) Marie Curie project.

channel interference and cognition to the user perception of the service, i.e., Quality of Experience (QoE).

The project will analyze and propose network virtualization solutions for LTE-A networks, a technology which is envisioned to transform operation of cellular networks in the years to come. The project will

The work plan of CROSSFIRE is divided in four parts: Research

---

CROSSFIRE

An Initial Training Network (ITN) for LTE-Advanced Networks

**Newsletter**
**August 2013**
Issue Number 2

**In this issue:**

Project status 1
Recruitment of ESRs 2
Latest news 3

## Project status

This newsletter issue marks the completion of the first year of the CROSSFIRE project, which was launched on September 2012.

The project's progress may be briefly characterized by the following stand-out items:

- All Early Stage Researchers

- The first two training seminars have been already delivered to the ESRs and the first two complementary courses are currently being planned for November 2013.

- The first results of the research of CROSSFIRE members have been published in top journals and

Below, a picture of some of the project's participants, taken inside the Supélec campus, Paris, in the frames of the 2nd CROSSFIRE plenary meeting (more information in a following section).

From left to right:
Up: Marco di Renzo (CNRS), Dionysis Xenakis (UoA),

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CROSSFIRE

An Initial Training Network (ITN) for LTE-Advanced Networks

**Newsletter**
**May 2014**
Issue Number 5

**In this issue:**

Issue highlights 1
Meet the project seniors 2
4th plenary meeting & complementary courses 3
IEEE CAMAD 2014 4
Public Talks 5
Latest news 6
Upcoming events 7
Crossfire in social media 7

## Issue highlights

The CROSSFIRE project has been active for almost two years, showing significant research, training and dissemination activities. Four plenary meetings have been already organized and multiple seminars and complementary courses have been delivered, while the number of published papers continues to rise.

Samdanis (NEC), Neil Scully (Vodafone) and Vasilis Friderikos (KCL).

The highlights of the 4th plenary meeting and complementary courses held in Heidelberg, Germany, between the 3rd to 6th of March, 2014, are presented. ESRs had the opportunity to learn a lot about

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CROSSFIRE

An Initial Training Network (ITN) for LTE-Advanced Networks

**November 2013**
Issue Number 3

**In this issue:**

Issue highlights 1
Meet the project seniors 2
Latest news 3
3rd plenary meeting & first complementary courses 4
Publications news 5
Upcoming events 6
Crossfire in social media 6

## Issue highlights

This issue is released less than a month after the organization of the CROSSFIRE's 3rd plenary meeting, which took place in Barcelona, on the 4th-5th of November 2013. Hence, this newsletter issue is mainly dedicated on information about this meeting and about the complementary courses that followed and were delivered to

- Following the previous column on "*Recruitment of ESRs*" of past newsletters, where all twelve ESRs had been presented, the new column "*Meet the project seniors*" has been created. The background of three out of nine of the project seniors is given in this 3rd issue. This column will be completed after three

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CROSSFIRE

An Initial Training Network (ITN) for LTE-Advanced Networks

**Newsletter**
**February 2014**
Issue Number 4

**In this issue:**

Issue highlights 1
Meet the project seniors 2
Public Talks 3
Publications news 4
Upcoming events 5
Crossfire in social media 5

## Issue highlights

This quarterly issue is released just before the 4th CROSSFIRE plenary meeting and training activities, which will take place in Heidelberg during the first week of March 2014. Detailed information about this event will be available in the next newsletter issue.

The main focus of the Early Stage Researchers during the

audience. This topic is covered in pages 3-4, and includes a description of the delivered presentations together with some pictures. More information on the public talks of the remaining ESRs will be covered in the next issue.

Also, in this edition, the regular column "*Meet the project seniors*" is continued. The

presented. This column will be completed after two more issues with profiles of the remaining project seniors.

Finally, in this newsletter edition, information about the latest publications, upcoming events and social exposure of the project may be found.

Below is a graphical collection

# E-Newsletters

CROSSFIRE

An Initial Training Network (ITN) for LTE-Advanced Networks

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**May 2013**
Issue Number 1

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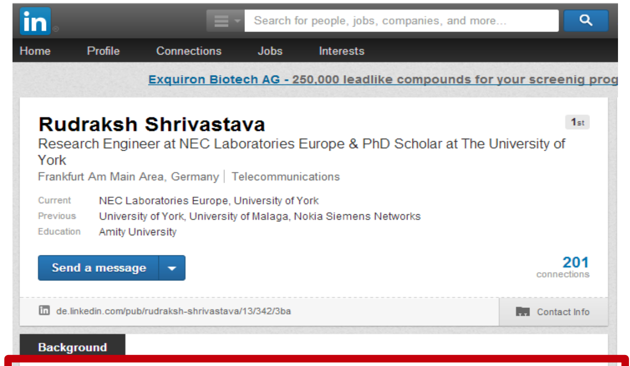
# ESRs in Social Networks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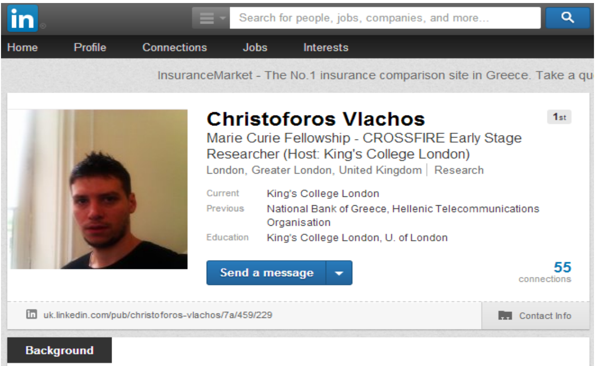
**Rudraksh Shrivastava** 1st
Research Engineer at NEC Laboratories Europe & PhD Scholar at The University of York
Frankfurt Am Main Area, Germany | Telecommunications
Current NEC Laboratories Europe, University of York
Previous University of York, University of Malaga, Nokia Siemens Networks
Education Amity University
201 connections
de.linkedin.com/pub/rudraksh-shrivastava/13/342/3ba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**Christoforos Vlachos** 1st
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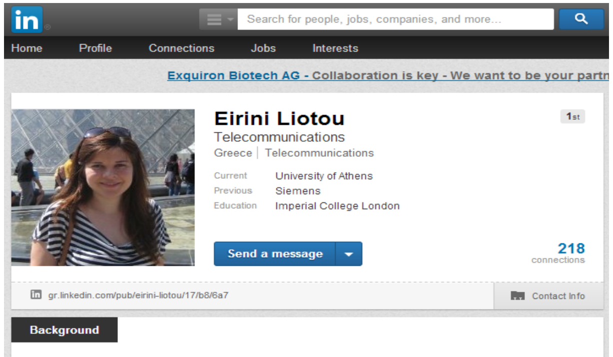
Previous National Bank of Greece, Hellenic Telecommunications Organisation
Education King's College London, U. of London
55 connections
uk.linkedin.com/pub/christoforos-vlachos/7a/459/229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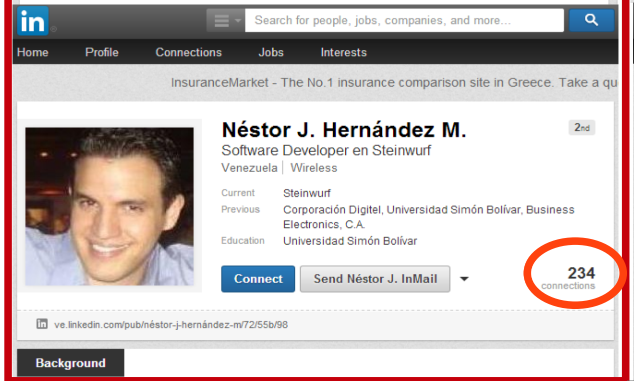
**Eirini Liotou** 1st
Telecommunications
Greece | Telecommunications
Current University of Athens
Previous Siemens
Education Imperial College London
218 connections
gr.linkedin.com/pub/eirini-liotou/17/b8/6a7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**Néstor J. Hernández M.** 2nd
Software Developer en Steinwurf
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Current Steinwurf
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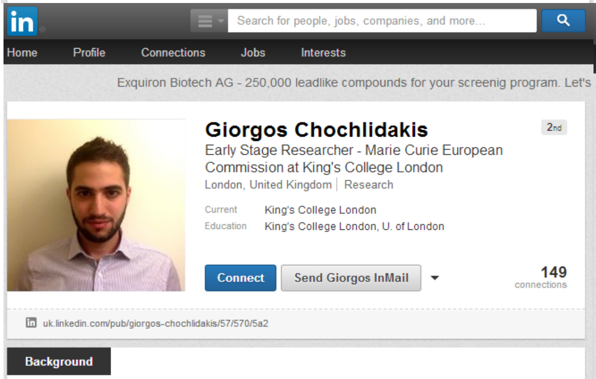
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**Giorgos Chochlidakis** 2nd
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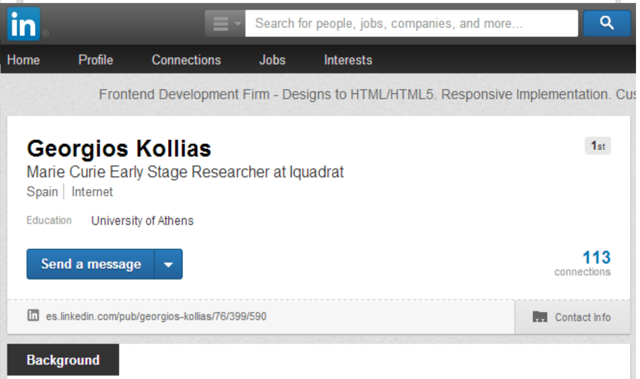
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**Georgios Kollias** 1st
Marie Curie Early Stage Researcher at Iquadrat
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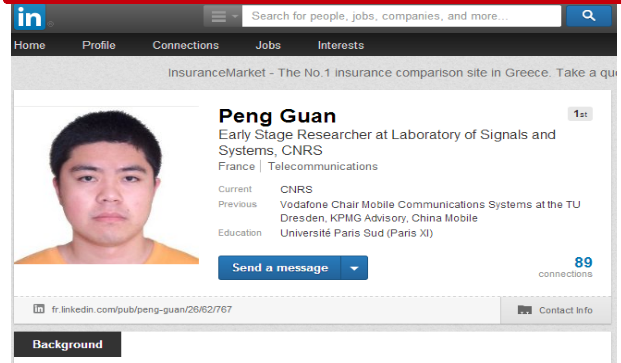
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**Peng Guan** 1st
Early Stage Researcher at Laboratory of Signals and Systems, CNRS
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Previous Vodafone Chair Mobile Communications Systems at the TU Dresden, KPMG Advisory, China Mobile
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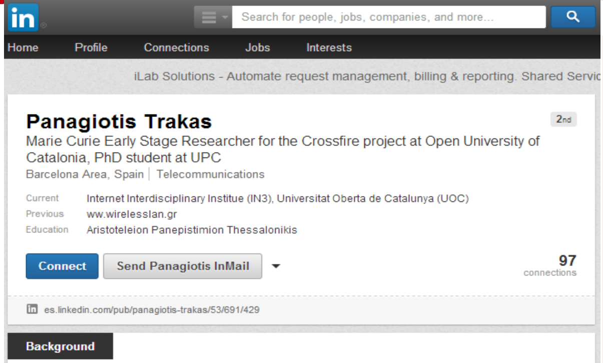
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**Panagiotis Trakas** 2nd
Marie Curie Early Stage Researcher for the Crossfire project at Open University of Catalonia, PhD student at UPC
Barcelona Area, Spain | Telecommunications
Current Internet Interdisciplinary Institue (IN3), Universitat Oberta de Catalunya (UOC)
Previous ww.wirelesslan.gr
Education Aristoteleion Panepistimion Thessalonikis
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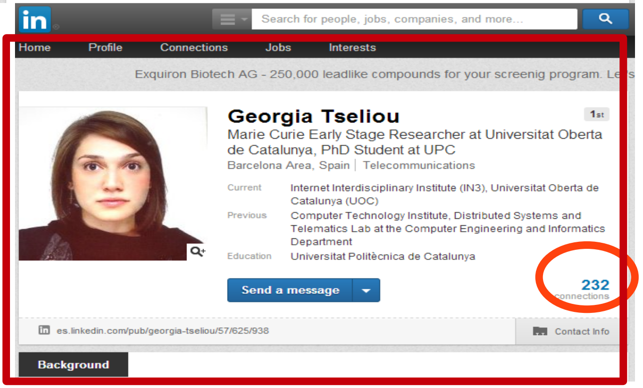
es.linkedin.com/pub/panagiotis-trakas/53/691/429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**Georgia Tseliou** 1st
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Previous Computer Technology Institute, Distributed Systems and Telematics Lab at the Computer Engineering and Informatics Department
Education Universitat Politècnica de Catalunya
232 connections
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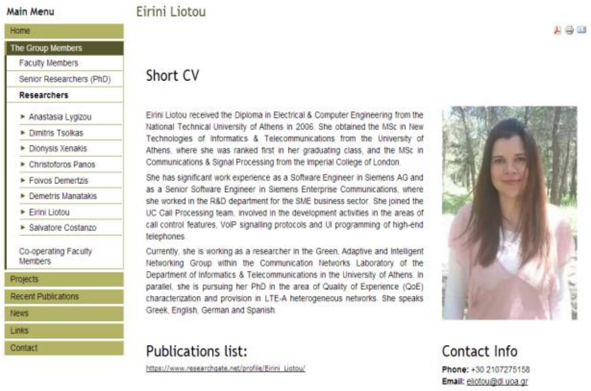
# Personal Web-pages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Foivos Demertzis
Demetris Manatakis
Eirini Liotou
Salvatore Costanzo
Co-operating Faculty Members
Projects
Recent Publications
News
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Eirini Liotou

Short CV

Eirini Liotou received the Diploma in Electrical & Computer Engineering from the National Technical University of Athens in 2006. She obtained the MSc in New Technologies of Informatics & Telecommunications from the University of Athens, where she was ranked first in her graduating class, and the MSc in Communications & Signal Processing from the Imperial College of London.

She has significant work experience as a Software Engineer in Siemens AG and as a Senior Software Engineer in Siemens Enterprise Communications, where she worked in the R&D department for the SME business sector. She joined the UC Call Processing team, involved in the development activities in the areas of call control features, VoIP signalling protocols and UI programming of high-end telephones.

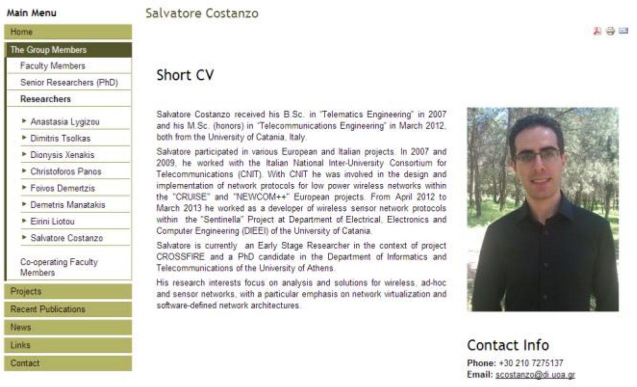
Currently, she is working as a researcher in the Green, Adaptive and Intelligent Networking Group within the Communication Networks Laboratory of the Department of Informatics & Telecommunications in the University of Athens. In parallel, she is pursuing her PhD in the area of Quality of Experience (QoE) characterization and provision in LTE-A heterogeneous networks. She speaks Greek, English, German and Spanish.

Publications list:

https://www.researchgate.net/profile/Eirini_Liotou/

Contact Info

**Phone:** +30 2107275158
**Email:** eliotou@di.uoa.gr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Salvatore Costanzo

Short CV

Salvatore Costanzo received his B.Sc. in "Telematics Engineering" in 2007 and his M.Sc. (honors) in "Telecommunications Engineering" in March 2012, both from the University of Catania, Italy.

Salvatore participated in various European and Italian projects. In 2007 and 2009, he worked with the Italian National Inter-University Consortium for Telecommunications (CNIT). With CNIT he was involved in the design and implementation of network protocols for low power wireless networks within the "CRUISE" and "NEWCOM++" European projects. From April 2012 to March 2013 he worked as a developer of wireless sensor network protocols within the "Sentinella" Project at Department of Electrical, Electronics and Computer Engineering (DIEEI) of the University of Catania.

Salvatore is currently an Early Stage Researcher in the context of project CROSSFIRE and a PhD candidate in the Department of Informatics and Telecommunications of the University of Athens.

His research interests focus on analysis and solutions for wireless, ad-hoc and sensor networks, with a particular emphasis on network virtualization and software-defined network architectures.

Contact Info

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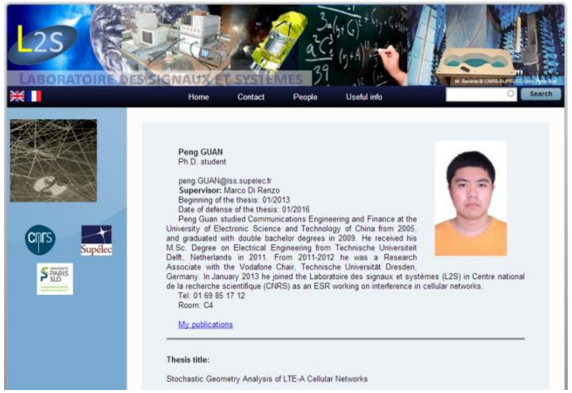
**Email:** scostanzo@di.uoa.gr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**Peng GUAN**
Ph.D. student

peng.GUAN@lss.supelec.fr
**Supervisor:** Marco Di Renzo
Beginning of the thesis: 01/2013
Date of defense of the thesis: 01/2016

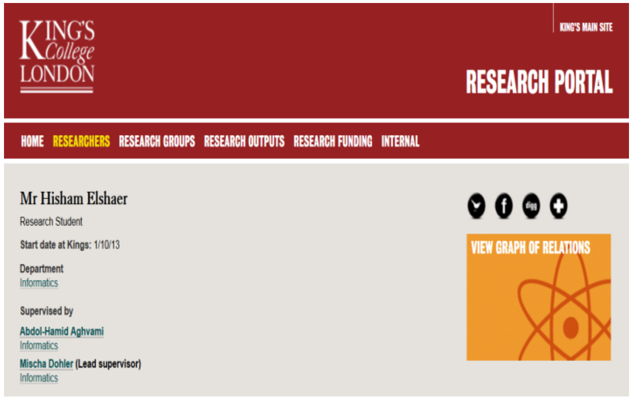
Peng Guan studied Communications Engineering and Finance at the University of Electronic Science and Technology of China from 2005, and graduated with double bachelor degrees in 2009. He received his M.Sc. Degree on Electrical Engineering from Technische Universiteit Delft, Netherlands in 2011. From 2011-2012 he was a Research Associate with the Vodafone Chair, Technische Universität Dresden, Germany. In January 2013 he joined the Laboratoire des signaux et systèmes (L2S) in Centre national de la recherche scientifique (CNRS) as an ESR working on interference in cellular networks.

Tel: 01 69 85 17 12
Room: C4

My publications

**Thesis title:**

Stochastic Geometry Analysis of LTE-A Cellular Networks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Mr Hisham Elshaer

Research Student

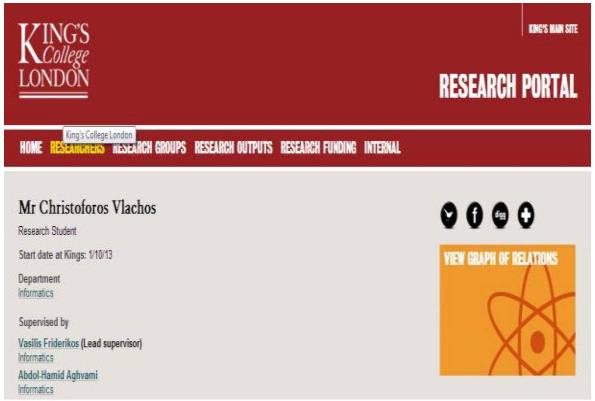
**Start date at Kings:** 1/10/13

**Department**
Informatics

**Supervised by**

**Abdol-Hamid Aghvami**
Informatics

**Mischa Dohler (Lead supervisor)**
Informatics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Mr Christoforos Vlachos

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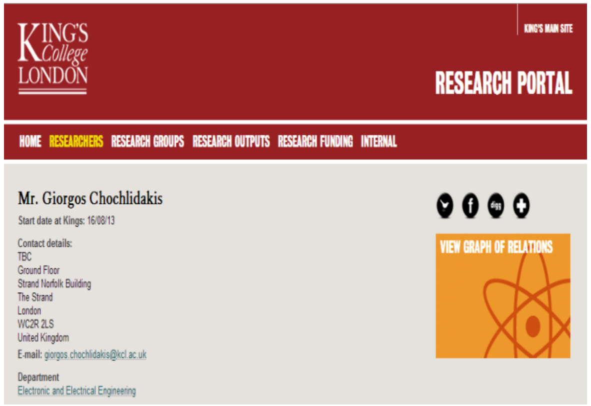
Informatics

Supervised by

Vasilis Friderikos (Lead supervisor)
Informatics

Abdol-Hamid Aghvami
Informatics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Mr. Giorgos Chochlidakis

Start date at Kings: 16/08/13

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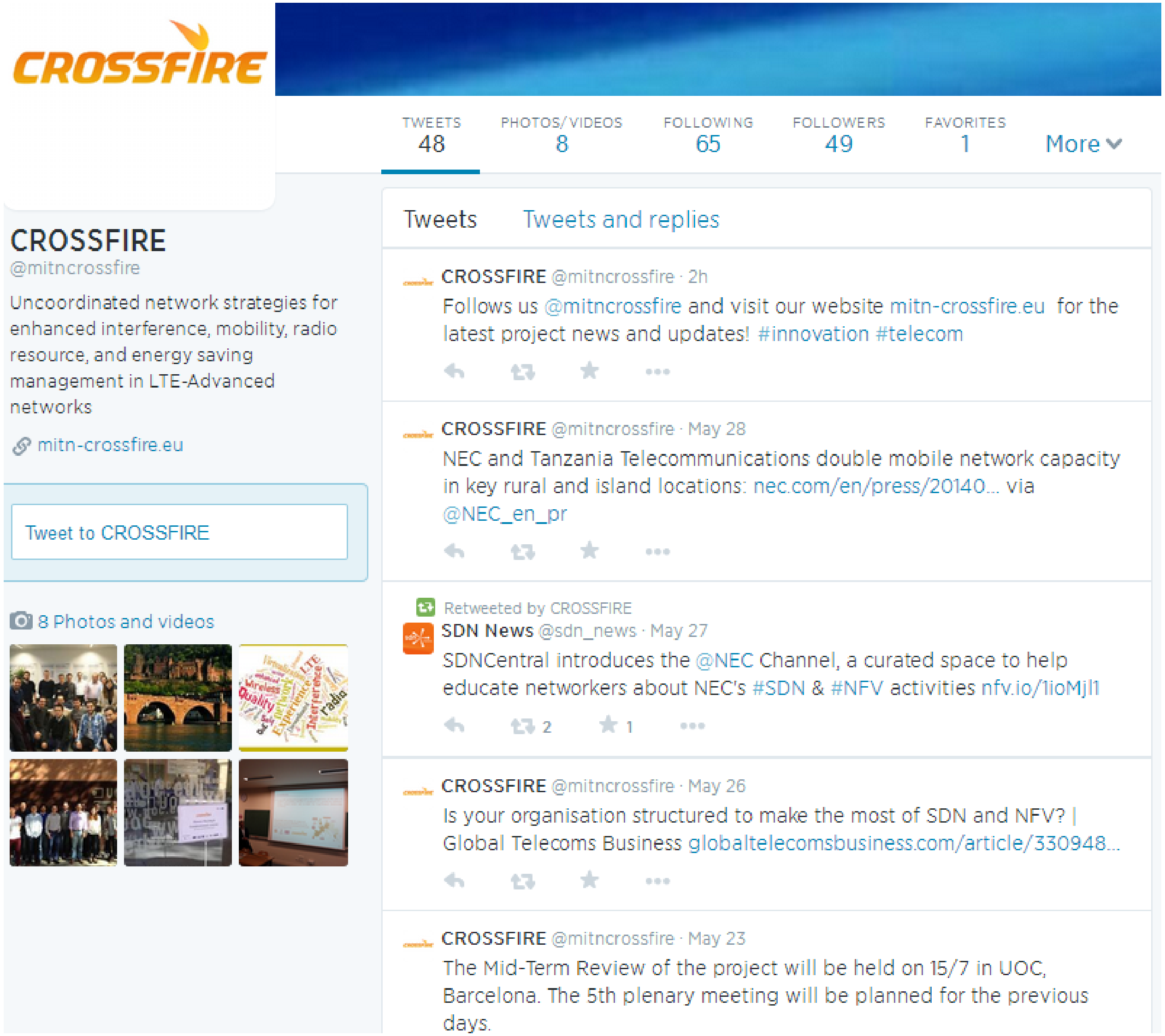
Department
Electronic and Electrical Engineering

# Crossfire Twitter



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Uncoordinated network strategies for enhanced interference, mobility, radio resource, and energy saving management in LTE-Advanced networks

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Follows us @mitncrossfire and visit our website mitn-crossfire.eu for the latest project news and updates! #innovation #telecom

**CROSSFIRE** @mitncrossfire · May 28
NEC and Tanzania Telecommunications double mobile network capacity in key rural and island locations: nec.com/en/press/20140... via @NEC_en_pr

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**SDN News** @sdn_news · May 27
SDNCentral introduces the @NEC Channel, a curated space to help educate networkers about NEC's #SDN & #NFV activities nfv.io/1ioMjl1
2 · 1

**CROSSFIRE** @mitncrossfire · May 26
Is your organisation structured to make the most of SDN and NFV? | Global Telecoms Business globaltelecomsbusiness.com/article/330948...

**CROSSFIRE** @mitncrossfire · May 23
The Mid-Term Review of the project will be held on 15/7 in UOC, Barcelona. The 5th plenary meeting will be planned for the previous days.

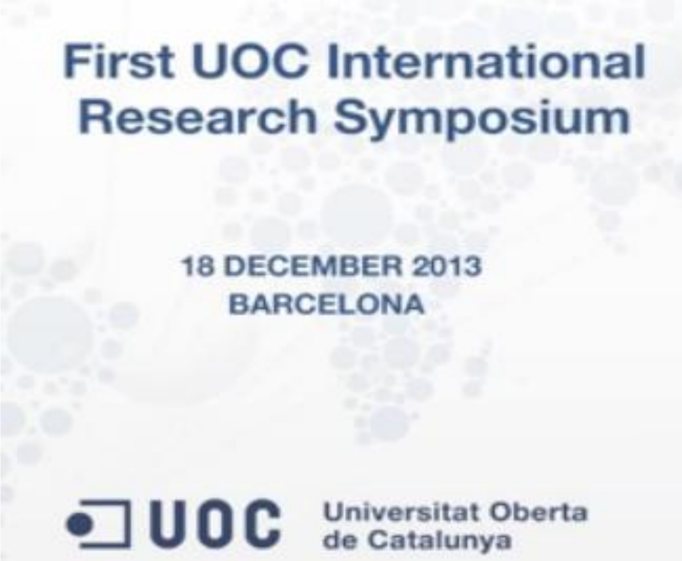
# Public Talks KCL/Vodafone

**Device-to-Device communications;
Soft injection in LTE-Advanced networks
for resource-centric solutions**
Christoforos Vlachos

**The CROSSFIRE project and its
contribution for the virtualization in
LTE-A networks**
Giorgos Chochlidakis

**Stepping towards 5G: An operator
perspective**
Hisham El Shaer

# Public Talks - UOC/IQU



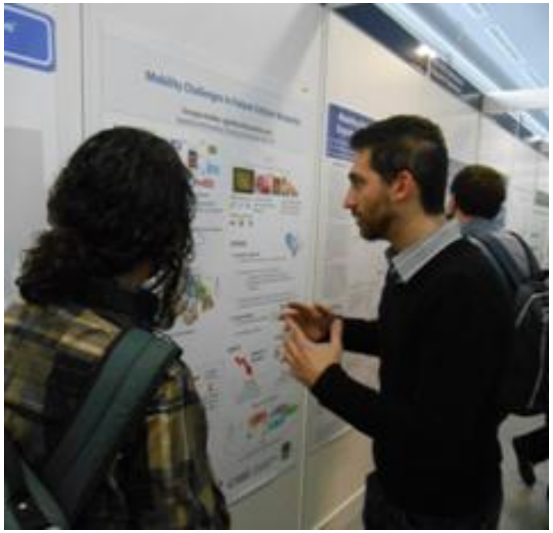
First UOC International Research Symposium

18 DECEMBER 2013
BARCELONA

UOC Universitat Oberta de Catalunya

The Symposium was intended to disseminate the research carried out at UOC

Infrastructure Sharing for 5G very dense Heterogeneous Networks



# Public Talks - UOA

**Eirini Liotou**
**“Quality of Experience”**

**Salvatore Costanzo**
**“Network Virtualization and the evolution of networking”**

# Public Talk - NEC

# And many unforgettable moments!

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# ESRs after CROSSFIRE

- Researcher at Université Pierre et Marie Curie, France
- Patent Examiner at European Patent Office, Netherlands
- Research Engineer at Huawei Technologies
- DevOps Network Planner at Sky, UK
- Senior Researcher at Vodafone Group R&D, UK
- Standardization Delegate at Fraunhofer, Germany
- Assistant Researcher at Aalborg University, Denmark
- Research Fellow, University of Athens, Greece

# How to get funded

- **Not a typical research project**
    - Research is a tool for training

- **Career development of young researchers**
    - All activities should be around the ESRs

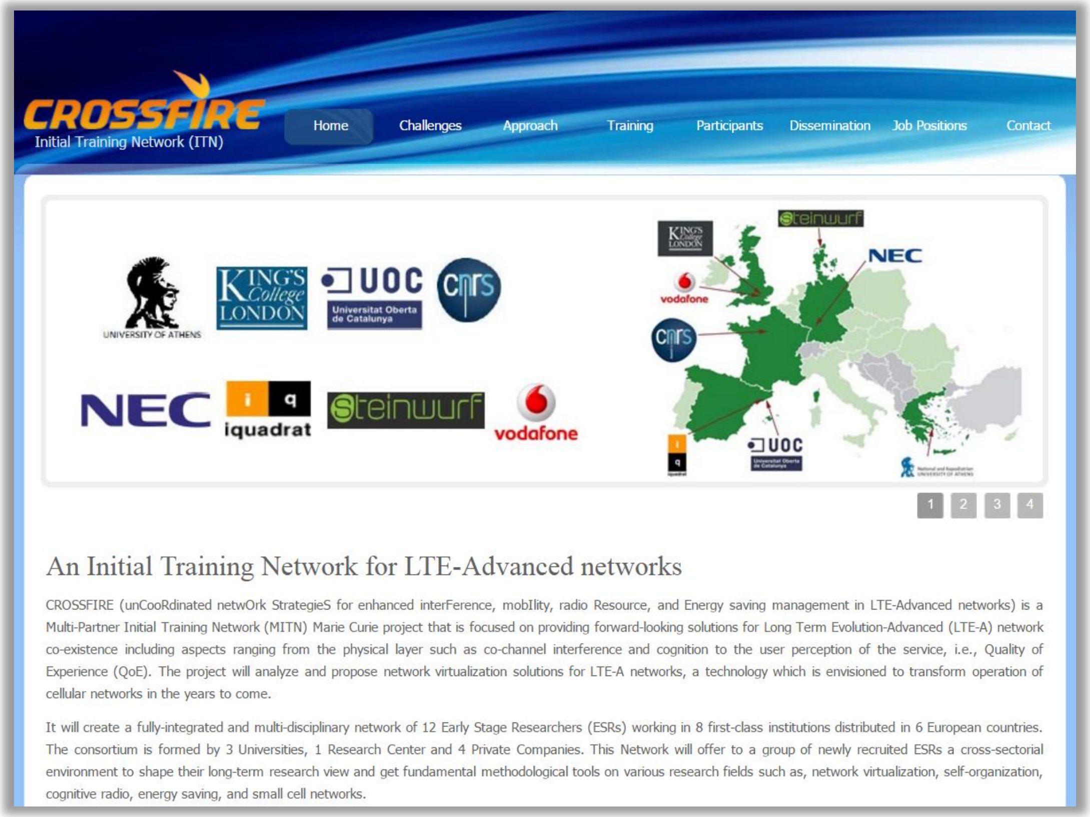
- **Very competitive scheme**
    - Acceptance rate 2016 <8%

- **Read the call carefully, line by line**
    - Don’t omit anything

# How to get funded

- **Consortium complementarity**
  - Academic, industrial, wide expertise
- **Research through a common technical target**
  - All ESRs working for that measurable target
- **Include all means of training**
  - Both direct and complementary
- **Many dissemination and outreach activities**
  - Part of the ESRs training
- **Show the impact to the ESRs career**

# For more information on CROSSFIRE: http://mitn-crossfire.eu or contact us: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An Initial Training Network for LTE-Advanced networks

CROSSFIRE (unCooRdinated netwOrk StrategieS for enhanced interFerence, mobIlity, radio Resource, and Energy saving management in LTE-Advanced networks) is a Multi-Partner Initial Training Network (MITN) Marie Curie project that is focused on providing forward-looking solutions for Long Term Evolution-Advanced (LTE-A) network co-existence including aspects ranging from the physical layer such as co-channel interference and cognition to the user perception of the service, i.e., Quality of Experience (QoE). The project will analyze and propose network virtualization solutions for LTE-A networks, a technology which is envisioned to transform operation of cellular networks in the years to come.

It will create a fully-integrated and multi-disciplinary network of 12 Early Stage Researchers (ESRs) working in 8 first-class institutions distributed in 6 European countries. The consortium is formed by 3 Universities, 1 Research Center and 4 Private Companies. This Network will offer to a group of newly recruited ESRs a cross-sectorial environment to shape their long-term research view and get fundamental methodological tools on various research fields such as, network virtualization, self-organization, cognitive radio, energy saving, and small cell networks.

**“CROSSFIRE” open group**

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**mitn.crossfire@gmail.com**