### Philips Research Europe

**Philips Research Europe – Eindhoven. The Netherlands. Professor de contacte: Eduard Alarcón**

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<th>Codi</th>
<th>NL PhilipsEin_1</th>
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<td>Estudis</td>
<td>Pla 92 i Graus</td>
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<tr>
<td>Data d'entrada</td>
<td>05.11.13</td>
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<tr>
<td>Tipus d'estada</td>
<td>PFC i TFG</td>
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<table>
<thead>
<tr>
<th>Descripció</th>
<th>Optical scattering in phosphor-converted LEDs</th>
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<tbody>
<tr>
<td>Description</td>
<td>The Philips Research Solid State Lighting group is searching for graduate and undergraduate students willing to contribute to the solid state lighting revolution. The student/s will work in a high tech industry facility together with a professional research team of electrical engineers and physicists. The proposed area of investigation deals with numerical methods and computational techniques to model the processes of photo-conversion and light extraction in power LED (Light-Emitting Diodes) devices. We aim at predicting the performance of phosphors by describing the underlying physics responsible for the conversion of pump blue light into white light in most of our current LUXEON LED products (visit Lumileds website). A 3D optics model of a thin film LED micro-structure in combination with the phosphor particle models ought to be studied and predictions compared to experiments. The student will have the opportunity to closely work with a research team investigating a number of exciting fundamental physics mechanisms that will likely make LEDs the single most important light source technology in the near future.</td>
</tr>
<tr>
<td>Context</td>
<td>Solid state lighting technologies are among the most prominent innovations influencing the way in which we improve our future by reducing energy consumption. So much so that the current 20% of the world’s electricity consumed by lighting can potentially be reduced to 4% with the full-scale adoption of LEDs.</td>
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<tr>
<td>Inici</td>
<td>July 2014 (or earlier)</td>
</tr>
<tr>
<td>Durada</td>
<td>6 months; extension possible.</td>
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<tr>
<td>Nombre de places</td>
<td>1</td>
</tr>
<tr>
<td>Requisits</td>
<td>Good programming skills, Good mathematics skills, particularly, numerical methods for solving PDEs (frequency and time domain), Good knowledge of Maxwell's equations, LED device physics knowledge, High motivation and good English (written and spoken)</td>
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<tr>
<td>Compensations</td>
<td>A compensation and housing allowance will be given.</td>
</tr>
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<td>Description</td>
<td>The Philips Research Solid State Lighting group is searching for graduate and undergraduate students willing to contribute to the exciting solid state lighting revolution. The student/s will work in a high tech industry facility together with a professional research team of electrical engineers. The student/s will closely work with the research team to fundamentally analyze a number of novel converter topologies suitable for LED drivers.</td>
</tr>
</tbody>
</table>
Solid state lighting technologies are among the most prominent innovations influencing the way in which we improve our future by reducing energy consumption. So much so that the current 20% of the world’s electricity consumed by lighting can potentially be reduced to 4% with the full-scale adoption of LEDs (Light-Emitting Diodes). LED electronics need to keep pace with the continuously increasing efficiency and miniaturization of LED engines.

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<tr>
<th>Inici</th>
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<tr>
<td>Durada</td>
<td>July 1 – December 31, 2014 (or earlier); extension possible</td>
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<td>Nombre de places</td>
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<tr>
<td>Requisits</td>
<td>Good knowledge in power electronics, Good knowledge in circuit theory and circuit simulation tools, Practical skills to set up and measure circuits, High motivation, teamwork, good English (written and spoken)</td>
</tr>
<tr>
<td>Compensations</td>
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</tr>
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**CERN**

CERN, European Organization for Nuclear Research

Programas que la Escuela podría reconocer:

1. Summer Student Programme:
   a. Programa enfocado a realizar prácticas y proporcionar experiencia profesional.
   b. De 8 a 13 semanas
2. Technical Student Programme:
   a. Programa enfocado a estudiantes que deseen realizar su proyecto final de carrera.
   b. 12 meses
   c. Existen 3 convocatorias al año con comités de selección para cada una de ellas
   d. La próxima convocatoria finaliza el próximo 5 de Marzo.
3. Open Lab Student Programme:
   a. Programa enfocado a realizar prácticas y proporcionar experiencia profesional.
   b. 9 semanas en verano.

**EADS Astrium**

EADS Astrium. Toulouse, França.

Astrium és una empresa francesa que ofereix una projectes enfocats a l’enginyeria aeronàutica. Consulta els projectes que et poden oferir en el següent link.

**TriaGnoSys GmbH**

TriaGnoSys GmbH, Wessling-Oberpfaffenhofen. Germany

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**Descripció**

Implementation of a Demonstrator

**Background**

In recent years continuous efforts by the Aviation community to improve upon the safety record within the Air Transport industry have been successful. Today, the outstanding safety level of air transport is in part due to the standard practice of having a two-pilot flight crew. Pilots have in many circumstances prevented accidents, notably mid-air collisions. Certain combinations of unpredictable situations, such as difficult meteorological conditions, multiple system failures or cockpit crew incapacitation, can lead to peak workload conditions. The amount of information and actions to process may, in these specific and difficult to predict cases, exceed the reasonably acceptable workload of the crew. As accidents are more likely to occur when workload in the cockpit is high, improving crew performance in peak workload conditions is thus critical to enhance safety. The ACROSS project will develop new cockpit applications and human-machine interfaces covering all safety related crew duties with the overall goal of reducing crew workload and improving the safety level in two-pilot operations.

TriaGnoSys participates in multiple work packages of the ACROSS project, being leader of the communications work package, where new data link technologies will be developed for provision of future safety-critical air-ground communication, such as for SESAR’s data-centric ATS/AOC communication, as well as for remote monitoring&control of the aircraft by a ground-based backup pilot. As part of the work of this package, a demonstrator will be built to validate the results obtained. This demonstrator will require implementation of
aircraft/cockpit and ground end-system demonstrator platforms to (a) generate realistic data to be sent over the air-ground data links and (b) to allow validation and demonstration of the ACROSS achievements.

Objectives
The goal of this thesis is to implement at least one part of said demonstrator. A list of already envisioned features of the demonstrator follows:

- End user aircraft (e.g. CPDLC HMI) and ground (e.g. monitoring&control HMI for backup pilot) system mock ups to display applications over the ACROSS communication platform.
- X-Plane Flight simulator communication (e.g. as aircraft simulator to generate realisticFDR/monitoring data to be sent to ground station and as ground station simulator to display monitoring data in a virtual cockpit).
- Future Radio Management Panel for control and monitoring of the aeronautical link status.
- TriaGnoSys will provide the interface to the Human Factors experts participating in ACROSS to make sure that the demonstrator platforms to be developed will comply as far as possible with the standards from cockpit avionics, e.g. regarding HMI design.

Methodology
1. Familiarization with the thesis framework.
2. Understand the demonstrator architecture.
3. Define the requirements of the implementation to be performed.
4. Implement the selected feature of the demonstrator.
5. Verify the implementation.

Implementation of a link emulator for Linux

Background
In recent years continuous efforts by the Aviation community to improve upon the safety record within the Air Transport industry have been successful. Today, the outstanding safety level of air transport is in part due to the standard practice of having a two-pilot flight crew. Pilots have in many circumstances prevented accidents, notably mid-air collisions. Certain combinations of unpredictable situations, such as difficult meteorological conditions, multiple system failures or cockpit crew incapacitation, can lead to peak workload conditions. The amount of information and actions to process may, in these specific and difficult to predict cases, exceed the reasonably acceptable workload of the crew. As accidents are more likely to occur when workload in the cockpit is high, improving crew performance in peak workload conditions is thus critical to enhance safety.

The ACROSS project will develop new cockpit applications and human-machine interfaces covering all safety related crew duties with the overall goal of reducing crew workload and improving the safety level in two-pilot operations. TriaGnoSys participates in multiple work packages of the ACROSS project, being leader of the communications work package, where new data link technologies will be developed for provision of future safety-critical air-ground communication, such as for SESAR's datacentric ATS/AOC communication, as well as for remote monitoring&control of the aircraft by a ground-based backup pilot. As part of the work of this package, a demonstrator will be built to validate the results obtained. This demonstrator will require a suitable tool to emulate the air-to-ground requirements of the link conditions for multiple IP link technologies (both satellite and direct air-ground such as LDACS).

Objectives
1. Writing a clear documentation.
2. Implementing a link emulator capable of:
   - Simulate delay on the packets based on a given probability density function.
   - Simulate a maximum bandwidth.
   - Enable QoS prioritization (i.e. high priority packets are sent before previously received low priority packets).
   - Simulate packet losses and bit errors.

Note: if you are familiar with Linux and the netem tool: netem has several downsides for our application and is not directly applicable for the link emulator we need and a new tool needs to be developed!
Methodology
1. Understand the objectives of the thesis.
2. Write the software requirements for the implementation.
3. Implement the link emulator.

Inici
Beginning from early 2014 or late 2014

Durada
The thesis shall be 6 months in duration.

Nombre de places
1

Requisits
C and/or C++ knowledge. Knowledge about probability concepts. Networking knowledge is preferred. Knowledge of the Linux code is welcomed. Medium to advanced English language proficiency is required.

Compensations
A compensation will be given.

Nokia Siemens
Nokia Siemens, Aalborg, Denmark

Codi
DK NSN Aal_1

Estudis
Pla 92 i Màsters

Data d'entrada
11/11/13

Tipus d'estada
PFC i TFM

Descripció
Medium Access Control and management improvements for High Efficiency Wireless LAN

The IEEE 802.11 standardization committee has launched in 2013 a study group focused on improving the efficiency of the MAC and management of the next generation WLAN standard. New issues, problems, and topics are daily rising from such investigations, and new horizons for the research frontier appear. In this project the focus will be in first evaluating the system level performance of a set of IEEE 802.11 MAC features in a proprietary simulator, and then pushing forward the research by improving their efficiency keeping the industrial focus aligned with the IEEE 802.11 HEW project.
**5G techniques proof-of-concept testbed**

A novel 5G radio access technology is currently being designed to circumvent the limitations of the existing radio standards in coping with the exponential increase of the data traffic in the next years. 5G technology will be focused in local area where a dense uncoordinated deployment of small cells with limited coverage is foreseen, and will feature a number of advanced techniques such as distributed synchronization, interference coordination and suppression. This project will focus on the design and implementation of some of the most promising 5G techniques over a testbed network based on USRP radio hardware. The aim is to address their effective potential in boosting the network throughput in a real world scenario.

**Tasks**

One of the key steps towards the implementation of maritime satellite systems is the development and implementation of a RA receiver. The candidate shall develop and implement a receiver able to cope with various RA schemes and to properly deliver incoming packets to a gateway, possibly coordinating with other peers. The receiver will be implemented in software defined radio (SDR) and will include functionalities like demodulation, de-interleaving, decoding, etc.

The candidate will be responsible, among the rest, of the following tasks:

- definition of the receiver requirements and features in order to cope with different random access schemes
- receiver design with flexible RA protocol capabilities
- implementation of the defined features in the SDR receiver
- verification of the implemented functionalities by receiving data coming from RA transmitters (already available)

### Inici
Summer 2014

### Durada
6 - 8 months

### Nombre de places
1

### Requisits
Studies in electrical, communications engineering or computer science, Good knowledge of layer 2 (medium access) protocols, Basic knowledge of channel-coding, Good programming skills (C/C++ and Matlab), Working level English.

### Compensations

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### Descripció
Design and Implementation of a flexible Random Access wireless Transmitter

The number of devices capable to interconnect is steadily increasing, posing new and interesting research questions. A remarkable example is the quest for an efficient way to manage the access of a large number of terminals to a shared wireless medium. One possible approach in this direction is the Random Access (RA) paradigm, with its simplest yet widespread ALOHA implementation. Based on this approach, more refined schemes have been proposed in the recent past, improving performance while adding complexity both at the receiver and at the transmitter side. As to the latter, multi-packet transmissions, pseudo random seed generation and advanced coding schemes are only some of the new features that are currently under investigation and deployment.

Within this context, DLR is investigating a satellite-based maritime communications scenarios, where a large number of ships travelling on the seas or oceans need to exchange data among each other or with a station on the ground. Data are sent from the see to the satellite using RA, and a high efficiency of the communication system has to be achieved.

### Tasks
As a first step towards the definition of a maritime satellite system, the development and implementation of a portable wireless transmitter will be carried out. Such a device will be of use as a proof of concept for some key ideas and algorithms for advanced RA techniques later to be refined.

To this aim, the candidate shall develop a portable transmitter with wireless capabilities, composed by a Linux based micro-PC and a radio frontend working in the WiFi frequency bands, and able to support different RA schemes. The candidate will be responsible of the following activities:

- setup of the basic transmitter system, with proper connection and interfacing of a micro-PC and a radio frontend
- definition of a transmitter software architecture capable of effectively coping with different random access schemes
- software design of the transmitter
- implementation of the defined features in the portable wireless transmitter
- definition and realization of a test campaign

### Inici
Summer 2014

### Durada
6 - 8 months

### Nombre de places
1

### Requisits
Studies in electrical or communications engineering or computer science, Basic knowledge of layer 2 (medium access) protocols, Good knowledge about Linux operative systems, Good programming skills (C/C++), and knowledge about embedded programming, Working level in English.

### Compensations

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<td>Pla 92</td>
<td>25.11.13</td>
<td>PFC</td>
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### Descripció
WDM Optical Fiber Networks

Company: Alcatel-Lucent FRANCE (www.alcatel-lucent.com)

Alcatel-Lucent has helped weave the technological fabric of modern society. Since its founding technology from Alcatel-Lucent has shaped the ways people live, work and play. Over the past years, Alcatel-Lucent R&D community has made seminal scientific discoveries, created powerful new technologies, and built the world’s most advanced and reliable networks.

Project:
Fiber-optic communications are evolving from simple intensity modulation with direct detection systems towards sophisticated multilevel modulation with coherent detection. Furthermore, digital signal processing techniques are also under development to overcome the main limitations given by transmission impairments. The project will focus on research and development of specific topics related with WDM Optical Fiber Networks.

Location: Alcatel-Lucent France
Centre de Villarceaux
Route de Villejust
<table>
<thead>
<tr>
<th>Bell Laboratories</th>
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<tbody>
<tr>
<td>Bell Laboratories (Alcatel-Lucent), NJ, USA. Professor de contacte: Joan M. Gené Bernaus</td>
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**Descripció**

*High Capacity Fiber-Optic Transmission Systems*

Introduction and Short description:
Bell Labs (www.bell-labs.com) has helped weave the technological fabric of modern society. Since its founding in 1925, technology from Bell Labs has shaped the ways people live, work and play. Over the past 80 years, the Bell Labs R&D community has made seminal scientific discoveries, created powerful new technologies, and built the world’s most advanced and reliable networks. Here are some Bell Labs innovations that changed the world:

Project:
Fiber-optic communications are evolving from simple intensity modulation with direct detection systems towards sophisticated multilevel modulation with coherent detection. Furthermore, digital signal processing techniques are also under development to overcome the main limitations given by transmission impairments. The scope of the project is to investigate on advanced modulation and detection schemes to exploit the huge capacity of an optical fiber. Some scientific references on the topic are:

Location:
791 Holmdel-Keyport Rd., Holmdel, NJ 07733, USA
maps.google.com  40.390736,-74.1866
70 Km from Manhattan (New York City) www.nycgo.com
Public Transport www.njtransit.com
Newark Int. Airport www.panynj.gov/airports/newark-liberty.html

| Inici | February 2015 |
| Durada | 6-9 months |
| Nombre de places | 1 |
| Requisits | Excellent academic records, good English knowledge, fiber-optic communications, digital communications, signal processing, laboratory skills, Matlab simulation, VHDL. |
| Compensations | A compensation will be given. |

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<th>Idiap Research Institute</th>
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<td>Idiap Research Institute - EPFL’s Idiap Laboratory</td>
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**Descripció**
The positions are open for PFC/MT to do research on:
1.- Social media analysis
2.- Ubiquitous computing for human behavior analysis

<p>| Inici | |
| Durada | 6 months |</p>
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<tr>
<th>Nombre de places</th>
<th>2</th>
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<tbody>
<tr>
<td>Requisits</td>
<td>Candidates will have a degree in computer science, information science, or electrical engineering with strong mathematical and programming skills and keen to learn about interdisciplinary research.</td>
</tr>
<tr>
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</table>
## Project Description

**Virtualization in testing: meeting the challenges of LTE-Advanced**

With the steady growth in demand for mobile broadband, technologies like LTE and LTE-Advanced are rapidly becoming essential in providing the desired level of connectivity. Based on innovative communication techniques, these radio access technologies pose, however, new challenges in developing and testing products that incorporate them.

With the introduction of LTE-Advanced, Intel® is considering the possibility of migrating part of the testing effort from expensive field experiments to virtual experiments in the laboratory. Within the scope of the internship, the candidate will join a team of engineers and researchers developing methods to enable such a migration. In particular, under the supervision of such a team, she/he will:

- Develop an understanding of LTE/LTE-A
- Deal with theoretical as well as practical aspects of testing methodologies
- Testing on Intel® products
- Implementation of novel testing solutions using MATLAB and C++

### Requisites

Solid skills are expected in the following fields:

- Signal processing for digital communications
- Digital communications
- C/C++ programming
- MATLAB
- Good written and oral English skills
- Good relation and communication skill

### Compensations

A compensation will be given.

---

**Advanced testing method for LTE / LTE-A: theory and practice.**

As mobile communications evolve, new technologies such as LTE / LTE-A aim at providing connectivity in a wider range of situations. Testing becomes thus an always more challenging task.

The intern will be integrated in a team of young researchers and engineers. His task will consist in participating in the development of new testing methods for products. In the frame of the internship, the student will, among others:

- Develop an understanding of LTE/LTE-A
- Deal with theoretical as well as practical aspects of testing methodologies
- Testing on Intel® products
- Implementation of novel testing solutions using MATLAB and C++
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<td>• Good written and oral English skills</td>
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| Compensations    | A compensation will be given.                                                                                     |