

# PFC a Empreses (Tardor 2015-16)



## Empreses on pots fer el PFC

### Empreses i Institucions que ofereixen projectes a l'ETSETB i que gestiona l'escola Última actualització: 7 de Maig del 2015

Quan demaneu una plaça mitjançant l'Intranet, ho haureu de fer en referència al codi que surt a la taula.

Atmosphere  
BCom Research Institute  
Bell Laboratories  
CERN  
DLR – German Aerospace Centre, Institute of Communications and Navigation  
EADS Astrium  
Intel Denmark  
IPAL  
NEC Laboratories Europe  
Nokia Siemens  
TriaGnoSys GmbH  
United Nations  
VPIphotonics

## Atmosphere

### Atmosphere. Weissling, Germany

Codi	D ATMOSPHERE_WEIS
Estudis	Graus i Masters
Tipus d'estada	TFG, TFM
Descripció	<p><b>In-Flight Satellite Application</b></p> <p>ATMOSPHERE GmbH, located in Munich, is an innovative SME that develops network enabled applications for the aviation sector, using state of the art navigation and communication means. ATMOSPHERE collaborates with major players such as the DLR, ESA, ZODIAC Aerospace.</p> <p>Subject: ATMOSPHERE has developed a lightweight solution to offer on-board connectivity services via satellite to airplanes and helicopters. The current solution operates on Inmarsat or Iridium satellite systems, and is deployed on several platforms (ATR42, Falcon20, Gulfstream G 550 Cessna Caravan, Diamond DA42, Eurocopter SuperPuma). ATMOSPHERE upgrades its solution to a web-based application, The current version presents some limitations:</p> <ul style="list-style-type: none"><li>• The service is available with a limited number of features.</li><li>• The service uses proprietary protocols which does not fully comply to open aviation standards (such as ARINC633 or MIAM protocols).</li></ul> <p>To address a broader market, the current solution needs to be extended. The proposed work is to study how to best overcome the current system limitations and to perform prototyping of the identified solutions. The result of the internship shall be a showcase working on touch tablets, capable of demonstrating one or several ARINC633 compliant services over various datalinks, possibly using MIAM protocol.</p> <p>Statement of Work :</p> <ul style="list-style-type: none"><li>• Needs identification, user requirement definition</li><li>• Feasibility study, prototyping</li><li>• Detailed design</li><li>• Software development and Validation</li><li>• Show case preparation</li><li>• Documentation</li></ul>
Inici	First semester 2015
Durada	4 to 6 months

Nombre de places	1
Requisits	Network and Software engineering : Operative System UNIX ,Web Services, Object oriented development languages (python, JavaScript), web development (HTML5,CSS3) Languages: English, German would be a plus.
Compensations	

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### BCom Research Institute

#### BCom Research Institute. Rennes, França

Codi	FR BCOM-Rennes_1
Estudis	Graus i Masters
Tipus d'estada	TFG, TFM
Descripció	<p><b>Transform coding for video compression</b></p> <p>H.264 / AVC is the most deployed video coding in the marketplace. Its successor, the HEVC standard, finalized in January 2013, improves by a factor of 2 the compression ratio compared to H.264 / AVC and currently represents the state of the art in video compression.</p> <p>The B-Com research institute wants to develop innovative technologies for future image and video compression standards. In this context, the objective of this internship is to evaluate innovative video compression algorithms based on new approaches to increase the performance of existing compression techniques. Specifically, emerging algorithms, implementing new transform coding techniques give interesting results. The internship is in this context.</p> <p>Two aspects will be developed as part of this internship:</p> <ul style="list-style-type: none"> <li>• In a first part, the focus will be on improving metrics to obtain effective transforms for compressing the signal distortion subject to a given distortion.</li> <li>• A second area will focus on the incorporation of these metrics into an encoder / decoder chain.</li> </ul> <p>These two complementary developments will be made on the basis of available and already developed B-Com systems: a transforms learning algorithm design for video coding algorithms and a software based on HEVC video coding.</p> <p>Different approaches will be studied and completed theoretically and evaluated on a set of video sequences. Thus the internship includes theoretical elements (signal compression, source coding, learning techniques) and programming elements (made primarily in C and C ++).</p>
Inici	Spring 2015
Durada	6 months
Nombre de places	1
Requisits	General knowledge in video and image compression algorithms, image processing. Interest in signal processing. Excellent knowledge in C/C++.
Compensations	

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### Bell Laboratories

#### Bell Laboratories (Alcatel•Lucent). NJ, EUA. Professor de contacte: Joan M. Gené Bernaus

Codi	USA Alcatel_1
Estudis	Pla 92, Màster i graus
Tipus d'estada	PFC

	<p><b>High Capacity Fiber-Optic Transmission Systems</b></p> <p>Introduction and Short description: Bell Labs (<a href="http://www.bell-labs.com">www.bell-labs.com</a>) 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&amp;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: The Transistor (1947), Shannon's Information Theory (1948), Laser (1958), Communications Satellites (1962), The CCD (1969), Unix Operating System and C Language (1969-1972), Digital Signal Processor (DSP) (1979), Optical WDM systems and networks (1990), First 100G Ethernet transmission (2005).</p> <p>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:</p> <ul style="list-style-type: none"> <li>• Peter J. Winzer, "Beyond 100G Ethernet", IEEE Communications Magazine, vol. 48, no. 7, pp. 26-30, July 2010.</li> <li>• René-Jean Essiambre, Gerhard Kramer, Peter J. Winzer, Gerard J. Foschini, Bernhard Goebel, "Capacity Limits of Optical Fiber Networks", IEEE-OSA Journal of Lightwave Technology, vol. 28, no. 4, pp. 662-701, February 2010.</li> </ul> <p>Location: 791 Holmdel-Keyport Rd., Holmdel, NJ 07733, USA <a href="http://maps.google.com">maps.google.com</a> □ 40.390736,-74.1866 70 Km from Manhattan (New York City) <a href="http://www.nycgo.com">www.nycgo.com</a> Public Transport <a href="http://www.njtransit.com">www.njtransit.com</a> Newark Int. Airport <a href="http://www.panynj.gov/airports/newark-liberty.html">www.panynj.gov/airports/newark-liberty.html</a></p>
Descripció	
Inici	February 2016
Durada	6-12 months
Nombre de places	1
Requisits	Excellent academic records, good English knowledge, fiber-optic communications, digital communications, signal processing, laboratory skills, Matlab simulation, VHDL.
Compensacions	A compensation will be given (subject to student's performance).

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## CERN

### CERN. Ginebra, Suïssa

#### CERN, European Organization for Nuclear Research

Tipus de programes: **PFC i/o practicas**

Solicitud de plazas: Para todos los programas, la solicitud deberá hacerse a través de la web del **CERN** (<http://www.cern.ch/>) y los candidatos serán seleccionados por el CERN. Si es el caso, la Escuela podrá reconocer las práctica o proyecto como programa de movilidad.

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.

La ETSETB no tiene ningún convenio con este centro. Se trata de un concurso público mundial.

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## DLR – German Aerospace Centre, Institute of Communications and Navigation

### DLR – German Aerospace Centre, Institute of Communications and Navigation, Oberpfaffenhofen-Wessling, Alemania.

Codi	D DLR Wess-1
Estudis	Pla 92 i Màsters
Tipus d'estada	PFC i TFM
Descripció	<p><b>Analysis of Backhauling Techniques for full-duplex Communication Networks</b></p> <p>The thesis will investigate the back-hauling techniques for a full-duplex communication network involving an LTE base station that connects the users to the backhaul through a satellite. For example, consider a set of users in a coach of a train that are connected to a base-station (LTE) located on the coach which has a link to the satellite. Such scenarios are of</p>

	<p>interest in providing data and voice communication in various transport systems and also to certain cases of disaster hit regions. The network can be modelled as a type of relay channel which admits a broadcast and multiaccess (MAC) components. The network in consideration is shown below with a set of N users (S1, ..., Sn) trying to communicate with the destination D through a relay.</p> <p>Tasks</p> <ul style="list-style-type: none"> <li>• Modelling and designing the information theoretic framework for the rate region of the network.</li> <li>• Extend the study to the Gaussian case with Rician fading model for satellite networks.</li> <li>• Compare the results to traditional half-duplex methods with simulations and provide an analysis.</li> </ul> <p>Contact Mohit Thakur, DLR, Institute of Communications and Navigation, Oberpfaffenhofen, D-82234 Wessling Tel.: + 49(0)8153 28 2903, Fax. + 49(0)8153 28 2844, E-Mail: mohit.thakur@dlr.de</p>
Inici	Immediat
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.
Compensacions	
Codi	D DLR Wess-2
Estudis	Pla 92 i Màsters
Tipus d'estada	PFC i TFM
Descripció	<p><b>Network and protocol architectures for Next-Generation backhauling over satellite</b></p> <p>The advent of 5G technology in the framework of Horizon 2020 is going to further exacerbate the scarce availability of spectrum resources. In order to overcome possible performance limitations (e.g., QoS) the complementarity of satellite link is envisioned to be a promising option. To this regard, efficient exploitation of the available frequency bands can be reached when wireless and satellite technology can share the same spectrum range. The design of such a system introduces however formidable challenges from the networking perspective, in terms of the most suited network architecture supporting communication of fixed and mobile users in different scenarios, taking advantage of the most recent findings in terms of content-delivery networks, caching and overall mobility. Furthermore, adequate protocol solutions should be engineered to efficiently support data communications in this context, possibly looking at solutions not necessarily based on the TCP/IP protocol stack..</p> <p>Tasks</p> <ul style="list-style-type: none"> <li>• To identify the technological challenges that Next Generation backhauling may have on traditional TCP/IP architectures.</li> <li>• To work out new network architecture candidates, defined as overlay running on top of TCP/IP or as independent architectures, according to Information-Centric Networking (ICN) findings and possibly building on Software Defined Networking (SDN).</li> <li>• To carry on simulation campaigns to show the performance benefits resulting from the use of the proposed network architectures.</li> </ul> <p>Contact Mohit Thakur, DLR, Institute of Communications and Navigation, Oberpfaffenhofen, D-82234 Wessling Tel.: + 49(0)8153 28 2903, Fax. + 49(0)8153 28 2844, E-Mail: mohit.thakur@dlr.de</p>
Inici	Immediat
Durada	6 - 8 months
Nombre de places	1
Requisits	TCP/IP protocols and network architecture fundamentals. Mathematical modelling and algorithms. Knowledge of C/C++ programming languages. Familiarity with wireless and satellite networking concepts is a plus.
Compensacions	

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## EADS Astrium

### EADS Astrium. Toulouse, França.

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

Contacte: David Villa pascual (david.villapascual@astrium.eads.net)

L'ETSETB no té ningun conveni amb aquesta empresa. Es tracta d'un concurs públic mundial.

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## Intel Denmark

### Intel Denmark. Aalborg, Denmark.

Codi	DK Intel_1
Estudis	Graus i Màsters
Tipus d'estada	TFG, TFM

	<p><b>GPU-accelerated simulator for 5G millimeter communications</b></p> <p>Over the last decade, the demand for mobile data has been steadily growing. In response, the industry engaged in two different types of research efforts. At first, the attention was focused on increasing the spectral efficiency of the fourth generation of mobile radio access technologies. This has led to the creation of LTE-Advanced and its direct successors. More recently, the focus has been shifting towards millimeter communications, which is one of the aspects defining the fifth generation (5G) of mobile radio access technologies.</p>
Descripció	<p>As one of the largest suppliers to the wireless value chain, Intel is at the forefront of millimeter communication research. Within the scope of the internship, you will support a team of engineers and researchers in creating a detailed simulator for millimeter communications and 5G radio access technologies. Specifically, you will join our team in accelerating receiver algorithms using OpenCL and/or GPU-specific libraries.</p> <p>Contact: If preferred, the internship can be offered in conjunction with a graduation project. Please send CV and motivation letter to the following contact: Dr.-Ing. Tommaso Balercia (tommaso.balercia@intel.com)</p>
Inici	Second semester 2015
Durada	9 to 12 months
Nombre de places	1
Requisits	<p>Familiarity with the following topics is required:</p> <ul style="list-style-type: none"> <li>- Programming in MATLAB</li> <li>- Programming in C/C++</li> <li>- Written and oral English</li> </ul> <p>Exposure or experience with any of the following topics is preferred:</p> <ul style="list-style-type: none"> <li>- Programming in OpenCL</li> <li>- Programming with NVIDIA CUDA libraries</li> <li>- Digital communications</li> <li>- Team work</li> </ul>
Compensacions	A compensation will be given

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## IPAL

### IPAL. Singapore.

Codi	F SGP IPAL_1
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Automated machine learning in 3D/4D biological image data</b></p> <p>Introduction and Short description: IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematic: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project: In modern biology imaging is a key element of all research, especially in developmental biology. New imaging techniques like two-photon microscopy or light-sheet microscopy can provide high-quality data of developing embryos, but these techniques are not yet routine microscopy. More standard microscopy like confocal or spinning-disk are more common, but provide data with lower quality. We showed that using machine learning techniques we could however extract meaningful information from 4D data (GulMohammed, BMC bioinformatics 2014). We would like to pursue this research by completely automating the process of learning and segmentation of data.</p> <p>Expected deliverables: Data quality is not uniformly distributed in the data, images are usually far better quality with higher contrast at the beginning of the experiment for 3D+t data (4D), and at slices closer to the objective. We would like to use this information to incrementally update the learning set, starting with unsupervised classification for easy steps, then use this information for later stages. The classification could be done at two different levels, either pixels for distinguishing between background and objects, and also at objects level to classify the cells in the different states of division.</p> <p>How to Apply: Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016

Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- Skills in programming, Matlab, or Java.</li> <li>- Familiarity with machine learning algorithms.</li> <li>- Strong motivation towards this challenging project.</li> <li>- Availability for 5 to 6 months starting in the first semester of 2015.</li> </ul>
Compensations	A compensation will be given
Codi	F SGP IPAL_2
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Design of a Home Gateway for Ambient Assistive Livings</b></p> <p>Introduction and Short description:  IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematic: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project:  Making use of the transition towards ubiquitous environments where embedded computing devices seamlessly integrate and cooperate to serve human needs, we can design systems specially fitted to provide care to the ageing population. At IPAL, the UbiSMART framework is being developed to help the elderly lead an independent and purposeful life, through ambient assistive technologies. Therefore, we build smart spaces where sensors are deployed and reasoning algorithms implemented to gather knowledge about users' context. This knowledge can then be used to provide real-time services, as well as lifestyle assessment and coaching. The project incorporates research thematic including nomadic service discovery at home and in urban environments. We are currently packaging our system as a "smart home in a box" kit where a home gateway (1) pushes sensor data to a cloud-based platform where it is processed by server-side applications, and (2) provides the necessary subscriptions and configuration tools to access the cloud services.</p> <p>Expected deliverables:  This internship will lead to the design and development of a BeagleBone-based home gateway integrating a wireless communication module for the communication with sensors and activators (e.g. ZigBee, X10). It will act as gateway between the local hardware on binary protocol and the cloud platform accessed over a REST link. It will also perform light pre-processing of the data and centralise all the configuration processes needed to setup an environment. Some sensors will be prototyped on Arduino Uno and integrated.</p> <p>How to Apply:  Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- Skills in Linux, embedded systems (Arduino, etc.) and ease in programming.</li> <li>- Strong motivation towards this challenging project.</li> <li>- Availability for 5 to 6 months starting in the first semester of 2015.</li> </ul>
Compensations	A compensation will be given
Codi	F SGP IPAL_3
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Design of a REST Framework for Ambient Assistive Livings</b></p> <p>Introduction and Short description:  IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematic: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND</p>

	<p>SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project: Making use of the transition towards ubiquitous environments where embedded computing devices seamlessly integrate and cooperate to serve human needs, we can design systems specially fitted to provide care to the ageing population. At IPAL, the UbiSMART framework is being developed to help the elderly lead an independent and purposeful life, through ambient assistive technologies. Therefore, we build smart spaces where sensors are deployed and reasoning algorithms implemented to gather knowledge about users' context. This knowledge can then be used to provide real-time services, as well as lifestyle assessment and coaching. The project incorporates research thematic including nomadic service discovery at home and in urban environments. We are currently packaging our system as a "smart home in a box" kit where a home gateway (1) pushes sensor data to a cloud-based platform where it is processed by server-side applications, and (2) provides the necessary subscriptions and configuration tools to access the cloud services.</p> <p>Expected deliverables: This internship will lead to the design and development of a REST version of UbiSMART running on the cloud. The framework will include services to enable the reception of data provided by multiple home gateways (using node.js). It will ensure its storage in a triplestore and enable its access through a dedicated API. Key processing applications will be implemented and integrate with the triplestore API as an example. Services will also be implemented for the configuration, integration and maintenance of a the remote home gateways.</p> <p>How to Apply: Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- Skills in programming, REST, Javascript, server-side applications, node.js.</li> <li>- Strong motivation towards this challenging project.</li> <li>- Availability for 5 to 6 months starting in the first semester of 2015.</li> </ul>
Compensacions	A compensation will be given
Codi	F SGP IPAL_4
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Querying Probabilistic Data via Tree Decompositions</b></p> <p>Introduction and Short description: IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematic: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project: Probabilistic databases are compact representations of probability distributions over regular databases. A number of models have been proposed for probabilistic data, both relational [7] and XML [4]. Evaluating a Boolean query over such a probabilistic database means computing the probability that the query is true in the probability distribution represented by the database. While query evaluation is usually tractable on regular databases, evaluating queries in this sense on probabilistic databases is often intractable.</p> <p>A number of research works have looked at characteristics of queries that can make them tractable. For instance, queries without self-joins are tractable over tuple-independent databases if and only if they are hierarchical [2], while tree-pattern queries on XML data with a single join are tractable if and only if they are equivalent to a join-free query [3]. By contrast, our recent work [1] has shown that, as long as the data and probabilistic correlations jointly have bounded treewidth [6] in a certain sense, query evaluation of monadic second-order queries remains tractable. This result is, however, mostly of theoretical interest. We have not investigated the extent to which real-world probabilistic data can be modeled with bounded treewidth databases, or whether the tree-automata constructions from [1] can be effectively used for real applications. Another of our recent work [5] has shown that, even when the data does not have bounded treewidth, partial tree decompositions may help query evaluation. The objective of this internship is to explore concrete applications of the results of [1], perhaps inspired by partial decompositions as in [5], on</p>

	<p>real-world uncertain datasets. This may include the study of theoretical problems left open in [1] that are relevant for practical implementation: e.g., extending the constructions of this work to on-the-fly variants. These techniques should then be implemented on concrete query classes, perhaps with the help of MONA1, and evaluated on applications (e.g., routing in transportation networks with uncertain delays).</p> <p>Expected deliverables: This internship will lead to the implementation of tree decompositions for probabilistic query evaluations. Experiment will be run to test the viability of the approach, and results will be published, with target a major conference or journal in the data management area.</p> <p>How to Apply: Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Currently enrolled in a Master's programme in Computer Science, or in an engineering school</li> <li>- Strong background in theoretical computer science (automata theory, complexity, logics)</li> <li>- Programming skills</li> <li>- Strong motivation towards this challenging project.</li> <li>- Availability for 4 to 6 months starting in the first semester of 2014</li> </ul>
Compensations	A compensation will be given
Codi	F SGP IPAL_5
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Sensing Environment, Health and Hygiene from Social Media</b></p> <p>Introduction and Short description: IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematics: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project: Twitter users in Singapore seem to commonly share observations that may be useful for the monitoring of environment, health and hygiene issues in the country. For example, the following Tweet, accompanied with a photograph, reports a cleanliness problem in one of Singapore food court: "Dedrick Koh @DedrickKoh 23 Jul Actually, the ceiling at the Aljunied hawker center IS pretty dirty. [with photograph]". This other Tweet reports a possible threat to the environment: "Venice Phoon @VenicePhoon The smell here at the west side of Singapore is horrendous!! Due to the wind direction blowing the smell of fertilizers used by nearby farms. 5:24 AM - 2 Dec 13". Moreover, numerous Tweets and posting on other social media such as Facebook, Flickr and Instagram may have contained information allowing a rapid and continuous assessment of the haze situation in July 2013 or the flash floods in October and November 2013.</p> <p>Expected deliverables: In the first part of the project we aim to develop a prototype system for the discovery and fusion of information from social media for the early detection and monitoring of environment, health and hygiene issues and problems. In the second part of the project we study the proactive sensing and monitoring by means of crowd sourcing. We aim to design and develop a mobile application that allows users to post and tag environment, health and hygiene information to dedicated social media streams.</p> <p>How to Apply: Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- Skills in programming, C++, Java</li> <li>- Availability for 5 to 6 months starting in the first semester of 2015.</li> </ul>

Compensations	A compensation will be given
Codi	F SGP IPAL_6
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Spatial Information Extraction and Ontologies in video</b></p> <p>Introduction and Short description:  IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematic: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project:</p> <p>With the spreading of new mobile devices and video-monitoring cameras, more and more video data is available. Meaningful information should be retrieved from this data. Many research about extraction of semantic features focus on individual objects. However, most "events" occurring in videos involves multiple objects, hence we should consider the spatial and temporal relationships between the objects.</p> <p>Expected deliverables:  The work objective is to propose an automatic video annotation system which extracts spatial information about objects in video frames. Firstly, we could use the approach of mereo-topology [Randell 2012 IEEE PAMI] to build a formalized model of spatial information describing the absolute object position and relative positions between pairs of objects. Then we can use a semantic language such as N3 for defining the model of organization, and apply this model in order to extract meaningful information in videos and identify possible events .</p> <p>How to Apply:  Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- Skills in programming, Matlab, or Java.</li> <li>- Familiarity with video processing algorithms.</li> <li>- Strong motivation towards this challenging project.</li> <li>- Availability for 5 to 6 months starting in the first semester of 2015.</li> </ul>
Compensations	A compensation will be given
Codi	F SGP IPAL_7
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Large Scale Image Classification with Deep Learning</b></p> <p>Introduction and Short description:  IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematic: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project:  Image classification is one of the most challenging problems in computer vision research. The objective is to map a digital image into one or several labels. For this internship, we will explore the optimization of complex image classifiers using convolutional neural networks (CNN) trained with supervised deep learning algorithms. The data for training such complex models will consist of millions of training images belonging to thousands of classes. The objective will be to understand the various techniques to train the CNN models to achieve state-of-the-art image classification performances.</p>

	<p>How to Apply: Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- C++ (preferred) or Java</li> <li>- Python (preferred) or Matlab</li> <li>- Solid background in mathematics.</li> <li>- Basic understanding of machine learning.</li> <li>- Availability for 5 to 6 consecutive months.</li> </ul>
Compensacions	A compensation will be given
Codi	F SGP IPAL_8
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Object Localization with Deep CNNs</b></p> <p>Introduction and Short description: IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematics: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project: Deep models such as Convolutional Neural Networks (CNN) have recently led to major breakthroughs in image classification, closing the gap with human vision in a number of tasks. CNN models are however not directly designed with localization of the classified objects in mind and are not nearly as good at this task. Although a number of methods have been proposed to use CNNs for localization, accuracy and/or speed of the predictions must still be improved. During this internship, we will overview the state-of-the-art on localization using CNNs and explore different ways of improving upon it. Then, we will investigate how accurate information on localization can in turn help with classification.</p> <p>How to Apply: Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- C++ (preferred) or Java</li> <li>- Python (preferred) or Matlab</li> <li>- Solid background in mathematics.</li> <li>- Basic understanding of machine learning.</li> <li>- Availability for 5 to 6 consecutive months.</li> </ul>
Compensacions	A compensation will be given
Codi	F SGP IPAL_9
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Deep Learning: Solving the Detection Problem</b></p> <p>Introduction and Short description: IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematics: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p>

	<p>Project:  Deep learning algorithms such as convolutional neural networks dramatically changed the computer vision landscape by outperforming other state-of-the-art models in many object recognition tasks. Most benchmarks so far take place in the classification context, where an image known to contain a relevant object has to be labeled using one of the known object classes. In comparison, the use of deep learning algorithms in the object detection task is much less investigated.  During this internship, we will work on several aspects related to object detection including ROC characteristics of detectors, the multi-labeling problem -multiple instances of the same object and/or instances of multiple different objects within the same scene and localization within the scene.</p> <p>How to Apply:  Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- C++ (preferred) or Java</li> <li>- Python (preferred) or Matlab</li> <li>- Solid background in mathematics.</li> <li>- Basic understanding of machine learning.</li> <li>- Availability for 5 to 6 consecutive months.</li> </ul>
Compensations	A compensation will be given
Codi	F SGP IPAL_10
Estudis	Màster i Pla 92
Tipus d'estada	TFM
Descripció	<p><b>Describing Images with Sentences</b></p> <p>Introduction and Short description:  IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematic: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project:  The recent advent of deep learning is considered by many as the definitive answer to the problem of the automatic tagging of images with words –the focus of intense research works over many years within the computer vision community. Today, the next frontier in automatic image understanding is the automatic generation of image captions: scenelevel descriptions with complex sentences.  During this internship, we will investigate joint text-image representations for complex scene understanding. The approach will focus on deep-text and deep-images models and their fusion.</p> <p>How to Apply:  Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- C++ (preferred) or Java</li> <li>- Python (preferred) or Matlab</li> <li>- Solid background in mathematics.</li> <li>- Basic understanding of machine learning.</li> <li>- Some NLP background will be considered a plus but not a requirement.</li> <li>- Availability for 5 to 6 consecutive months.</li> </ul>
Compensations	A compensation will be given
Codi	F SGP IPAL_11
Estudis	Màster i Pla 92
Tipus d'estada	TFM

	<p><b>Online Deep Learning for Google Glass</b></p> <p>Introduction and Short description: IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematics: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project: In this internship, we plan to bring together two exciting topics in computer vision - wearable computing and deep learning. Google Glass holds promise as we move beyond the era of cell phones into one of wearable computing. Meanwhile, deep learning has led to an incredible improvement in performance in recent years on several visual recognition tasks. Training deep learning models able to differentiate between thousands of object classes from scratch can typically take up to several weeks on modern GPUs and requires vast amounts of data. In comparison, online-learning algorithms able to quickly adapt existing deep models to new classes using a small quantity of data remain under-investigated. The applicant will explore how deep learning classification techniques can be used to help a user understand the world around him or her. Real-time video footage from Google Glass will be analyzed to find existing categories of objects in a database and learn new ones on the fly.</p> <p>How to Apply: Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Descripció	
Inici	febrer-març 2016
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- C++ (preferred) or Java</li> <li>- Python (preferred) or Matlab</li> <li>- Solid background in mathematics.</li> <li>- Basic understanding of machine learning.</li> <li>- Availability for 5 to 6 consecutive months.</li> </ul>
Compensacions	A compensation will be given
Codi	F SGP IPAL_12
Estudis	Màster i Pla 92
Tipus d'estada	TFM
	<p><b>Bio-inspired Vision for Mobile Robotics</b></p> <p>Introduction and Short description: IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematics: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project: The aim of this internship is to be inspired by biological systems to induce realistic camera movements on a robotic platform. Indeed, complex eye strategies are at work during the observation and navigation in animals and humans [1,2]. These strategies can be transferred in the context of observation and navigation for a robotic platform. On the technical aspects, the candidate will use FPGA technology equipped with inertial sensors, actuators and a camera. After a literature review, much of the work will consist of signal and image processing in VHDL (or Verilog) and in the design of an electronic card. This internship can lead to a PhD.</p> <p>Expected deliverables: This internship will lead to the design of a prototype of a vision robotic system. Another important deliverable will be the code associated to the hardware. Finally, the last important required deliverable is the report that has to be written in English.</p> <p>How to Apply: Applications should be sent by email to the named contact point(s) for the project of interest and should include a cover letter and a full CV. It is recommended that applicants apply before the 15th of December 2014. Please also find more information about our lab and research environment at <a href="http://www.ipal.cnrs.fr">www.ipal.cnrs.fr</a>.</p>
Descripció	
Inici	first semester of 2015
Durada	5 - 6 months period

Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Master Degree or Engineer Student (last year of studies).</li> <li>- Skills in programming: required VHDL and/or VERILOG.</li> <li>- Skills in electronics: Knowledge on Eagle, Proteus, Orcad or similar software would be appreciated.</li> <li>- Knowledge in Signal and Image Processing.</li> <li>- Strong motivation towards this challenging project.</li> </ul>
Compensations	A compensation will be given

**IPAL - LIRMM (Laboratoire Informatique Robotique Microélectronique Montpellier). Montpellier, França.**

Codi	F SGP IPAL_13
Estudis	Màster
Tipus d'estada	TFM
Descripció	<p><b>Dynamic sensors integration and monitoring within a pervasive framework.</b></p> <p>Introduction and Short description:</p> <p>IPAL is a French-Singaporean joint research laboratory, based in Singapore and formed as a CNRS (French National Center for Scientific Research) overseas laboratory. It involves internationally recognised Singaporean research institutions such as the National University of Singapore (NUS), and the Institute for Infocomm Research (I2R) of the Agency for Science, Technology And Research (A*STAR), as well as leading French institutions such as the University Joseph Fourier (UJF), the Institute Mines-Télécom and the University Pierre et Marie Curie (UPMC). Our research revolves around Inclusive Smart Cities &amp; Digital Health with exploratory topics in the following thematic: SEMANTIC REAL-TIME PROCESSING, DATA ANALYTICS, FORMAL VERIFICATION, HETEROGENEOUS WEB AND SPACES ACCESS, VISUAL MEMORY EXTENSION, AMBIENT INTELLIGENCE, HUMAN-MACHINE INTERACTION, VISUAL UNDERSTANDING &amp; EXPLORATION, QUALITY OF LIFE, COGNITIVE ASSISTANCE, INDEPENDENT LIVING.</p> <p>Project:</p> <p>Thanks to the recent technological breakthrough towards ubiquitous environments where embedded systems interact and cooperate to serve the users' needs, it is today possible to design systems that provide assistance to an ever aging population. In the LIRMM laboratory, the UbiSmart framework was developed to fulfill these constraints by the creation of smart spaces where sensors are deployed, and reasoning algorithms are being developed (using the Semantic Web). Following our experience in this domain and the several deployments we have performed, we have established the importance of a dynamic integration of sensors in our platform and through the reasoning process. The monitoring of the deployed systems' health and of the installed sensors is another requirement that we have identified. Indeed, our ambition for a large-scale deployment requires setting up a « smart-home in a box », that would be easy to deploy and to maintain without any particular skill, and that could fit any environment's configuration.</p> <p>Expected deliverables:</p> <p>During this internship, the student will have to set up the following points:</p> <ul style="list-style-type: none"> <li>• The dynamic integration of deployed sensors, in order to identify them into the Ubismart framework.</li> <li>• Enhancing the knowledge-base by associating a semantic to the newly discovered sensors.</li> <li>• Setting up a User Interface for newly discovered sensors' management.</li> </ul> <p>This work could be completed by the realization of the following points:</p> <ul style="list-style-type: none"> <li>• User Interface for the dynamic management of the reasoning based on the user's habits.</li> <li>• Monitoring of the deployed system and sensors to trigger alerts in case of technical problems.</li> </ul> <p>The accomplished work will be validated in future deployments.</p> <p>How to apply:</p> <p>Applications should be sent by email to the named contact point(s) for the project of interest and should include a full CV and a cover letter (in english or in french).</p>
Inici	September 2015
Durada	5 - 6 months period
Nombre de places	1
Requisits	<ul style="list-style-type: none"> <li>- Student in Master or Engineering school (last year of study).</li> <li>- Some experience is required in programming (python), and Unix systems, possibly some knowledge on system monitoring tools.</li> <li>- Some familiarity with one of these technologies will be appreciated : Semantic Web, Web development, NodeJS (SailsJS), Raspberry Pi.</li> <li>- Some motivation for an innovating and interdisciplinary project.</li> <li>- Being available for 5-6 months starting in the first semester of 2015.</li> <li>- This internship could lead to a PhD thesis.</li> </ul>
Compensació	A compensation will be given

## NEC Laboratories Europe

### NEC Laboratories Europe. Heidelberg, Alemanya

Codi	D NEC-Heil_1
Estudis	Màster, grau
Tipus d'estada	TFM, TFG
Descripció	<p><b>Secure and Private Data Mining</b></p> <p>Due to the proliferation of a myriad of interconnected devices (such as PCs, smartphones, smart sensors, smart appliances, etc.), recent studies show that the Internet is exponentially growing, day by day, generating massive amounts of data to be transmitted, stored and/or processed. Such phenomenon has been commonly called as the 'Big Data'. And this Big Data poses a number of challenges requiring novel and advanced techniques to address them. Thus for instance, due to the huge volume of data to be handled in these systems, traditional data bases solutions might become obsolete and inadequate, especially when such data need to be classified or categorized, or when hidden patterns in the data need to be extracted. In those scenarios, advanced data correlation mechanisms have been successfully proposed. Yet, there is another crucial aspect that must not be neglected, for the sake of a successful deployment and acceptance of these systems, namely, the privacy preservation of the sensitive data handled in there. Thus, NEC Laboratories Europe is seeking enthusiastic students willing to explore and contribute to the field of Secure and Private Data Mining, by collaborating and participating in an established research team, proposing their own innovative approaches. Students will be requested to put a special emphasis on high-quality publications, patents and input for standards</p> <p>NEC Laboratories in Heidelberg (Germany) provides an excellent working environment supporting individual creativity as well as strong teamwork. Please send applications electronically via the applications web system <a href="https://recruitment.nw.neclab.eu/">https://recruitment.nw.neclab.eu/</a> with reference to [2014-10-40-SEC]</p> <p>Project: Analysis of the current state-of-the-art different solutions to tackle the problem of classifying/clustering remote data in a secure and privacy-preserving way Development of a novel mechanism to securely correlate private-sensitive data Investigate on how to allow data owners to influence the correlation mechanism by providing feedback to the system and/or fine tuning certain parameters Analyze the scalability, accuracy and security (amongst other parameters) of the proposed solution</p>
Inici	November 2014 or later, early start preferred
Durada	6 months
Nombre de places	1
Requisits	Good knowledge of Machine Learning, Security background (crypto, ids, etc), Good knowledge in programming languages, Team working spirit, Good communication skills in English
Compensacions	

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## Nokia Siemens

### Nokia Siemens, Aalborg, Dinamarca

Codi	DK NSN Aal_1
Estudis	Màsters
Tipus d'estada	TFM
Descripció	<p><b>Interference Analysis and Management in Realistic Heterogeneous Networks</b></p> <p>The purpose of the project is to examine heterogeneous networks in real deployment by means of system-level simulations of a realistic network, including topology maps with real base station locations from an operator deployment, user traffic density values and propagation data from three-dimensional ray tracing tools. The project tasks involve the analysis of interference conditions in real heterogeneous networks, comparison with commonly used models, and the evaluation of interference mitigation possibilities with linear and non-linear receivers.</p>
Inici	September 1, 2015
Durada	8 months
Nombre de places	2
Requisits	Background in wireless communications and cellular systems; knowledge of medium access and physical layer in wireless communication systems and programming skills (C++, MATLAB)
Compensacions	A compensation will be given
Codi	DK NSN Aal_2
Estudis	Màsters
Tipus d'estada	TFM
Descripció	<p><b>Analysis of Heterogeneous Networks using Poisson Point Processes</b></p> <p>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</p>

	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.
Inici	September 1, 2015
Durada	8 months
Nombre de places	2
Requisits	Good background on wireless communications and communication theory; random signals and stochastic processes; very good MATLAB programming skills
Compensacions	A compensation will be given
Codi	DK NSN Aal_3
Estudis	Màsters
Tipus d'estada	TFM
Descripció	<b>Link and Rank Adaptation Algorithms for Interference Cancellation Receivers</b> Successive Interference Cancellation (SIC) receivers operate by successively demodulating and decoding the interfering streams in order to cancel it from the received signal, SIC receivers can provide very high gains. Its performance is much more modest under realistic channel conditions and assumptions. It has been shown literature that benefits of receiver be materialized a certain extent by dimensioning the system in order to fully benefit from interference cancellation techniques. In this project, we consider a MIMO system employing the advanced SIC receivers with multiple users. We would like to investigate how the system can be properly dimensioned in order to fully benefit from the SIC receivers. More specifically, we will consider what is the optimum number of transmitted streams (i.e. rank), and what is the required data rate (i.e. Modulation and Coding Scheme) of each stream, both from a network wide performance perspective.
Inici	September 1, 2015
Durada	8 months
Nombre de places	2
Requisits	System Level Simulation, Basic statistical knowledge, Mathematical analysis skills is preferred
Compensacions	A compensation will be given
Codi	DK NSN Aal_4
Estudis	Màsters
Tipus d'estada	TFM
Descripció	<b>Evaluating the Benefits of the Fluid Cells Concept</b> Suppose we have a network with N small cells, dimensioned to support a number of users in heavy traffic. When the traffic demand is lower it might be worth to turn off some of the small cells, in order to save energy. This will also reduce the intercell interference at other users. However, this may increase the path loss to the served users, which affects the throughput. So, there is a tradeoff between energy saving and interference reduction on one hand, and increased path loss on the other. To overcome this, the users may be allowed to use other users as relays. We can term this as the 'Fluid Cell' concept, where the cells are not as we know it today, but a UE can associate with multiple cells with the objective of higher throughput, better interference management, and energy efficiency. In this project, the aim is to evaluate the performance of the fluid cell concept with the objective of determining what is the best strategy in terms of the number of cells to be turned off, and in terms of the connectivity model.
Inici	September 1, 2015
Durada	8 months
Nombre de places	2
Requisits	System Level Simulation, Basic statistical knowledge, Mathematical analysis skills is preferred
Compensacions	A compensation will be given

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## TriaGnoSys GmbH

TriaGnoSys GmbH, Wessling-Oberpfaffenhofen. Germany

Codi	D TrGnSys-Wess1
Estudis	Pla92 i Masters
Tipus d'estada	PFC, TFM
Descripció	<b>Design and Implementaton of Sotware-based Components for the SPARTACUS Communicaton Units</b> The work will cover the adaptation of an existing system so as to meet the requirements of the SPARTACUS project. The system is actually a user interface allowing the control of the Communication Unit (power on/off equipments, handle distress messages, handle location and tracking of objects, etc.). The interface is based on HTML + SQL + Java and can be used in any web browsers. Additionally in this work, smart algorithms for link selection will have to be investigated from past and existing projects, selected, possibly modified and adapted, implemented and tested. The highlight of the

	SPARTACUS is a live demonstration which aims at advertising the different units designed and developed in the framework of this European project, including the Communication units TriaGnoSys is responsible for. The system handling the communication units is therefore of utmost importance.
Inici	February/March/April 2015
Durada	6 months
Nombre de places	1
Requisits	Strong programming knowledge (C++ and Java) is required. Good English level (spoken and written) is required
Compensations	A compensation will be given
Codi	D TrGnSys-Wess2
Estudis	Pla92, Graus i Masters
Tipus d'estada	PFC, TFG i TFM
Descripció	<p><b>Assessment of caching algorithms performance</b></p> <p>According to studies, a significant percentage of multimedia traffic is related to duplicate downloads of popular contents with large sizes. This led to the emergence of the application of caching techniques to networks (e.g Mobile networks 3G &amp; 4G) in order to reduce the traffic.</p> <p>Caching is a technique to reduce peak traffic rate by storing popular contents into memories nearby the users (cache). The cache is used lately when the users request data: If the cache contains the user request, this latter is served locally. Otherwise, the user must download the content from the original server (Youtube, Google ...) through the backhaul network, which is costly.</p> <p>Thus, TriaGnoSys (which is an expert in satellite communication enhancement) aims at deploying this technique within a broadcast satellite communication architecture. In this context, we propose this thesis, which aims at comparing, from different perspectives, several caching algorithms (e.g: LRU, LFU, ARC, Coded caching ...). The different perspectives and algorithms will be defined by the work supervisor. The thesis objectives are as follows:</p> <ul style="list-style-type: none"> <li>- Explore the specified caching algorithms</li> <li>- Simulate the specified caching algorithms</li> <li>- Evaluate the complexity of those algorithms</li> <li>- Asses then compare the performances of those algorithms in terms of traffic reduction.</li> </ul>
Inici	One position for September/October 2015, another for Feb/Mar/Apr 2016
Durada	6 months
Nombre de places	2
Requisits	High initiative and research skills are required. Basic programming is required. Knowledge in networking is appreciated. Good English level (spoken and written) is required.
Compensations	A compensation will be given
Codi	D TrGnSys-Wess3
Estudis	Pla92 i Masters
Tipus d'estada	PFC, TFM
Descripció	<p><b>Investigation of 60GHz technology for onboard avionics applications</b></p> <p>As a technology company we are always interested in looking at how cutting edge technologies may have an impact on our business. The 802.11ad standard has gotten a lot of attention recently, and we would like to investigate how we could develop products and applications based on this technology. The standard works in 60 GHz frequency band and offers physical layer data rate in the gigabit range. The objectives of this internship / thesis are:</p> <ul style="list-style-type: none"> <li>• Investigate the state of the art, study the details of the 802.11ad standard, including basic theoretical propagation conditions.</li> <li>• Iscreening of potential applications in the aeronautical / avionics environment</li> <li>• Screening of available off-the-shelf components and perform a small scale networking setup to perform e.g. throughput measurements, application quality of service assessments, etc.</li> </ul>
Inici	February to April 2015
Durada	3 - 6 months
Nombre de places	1
Requisits	SGood knowledge of wireless communications (wireless propagation models, link budget, wireless networking). Knowledge of Python programming language (useful for data analysis). Advanced English language proficiency.
Compensations	A compensation will be given

Estudis	Màsters
Tipus d'estada	TFM
Descripció	<p>To provide a framework by which graduate students from diverse academic backgrounds may be assigned to United Nations Offices where their educational experience can be enhanced through practical work assignments. To expose them to the work of the United Nations. To provide UN offices with the assistance of highly qualified students specialized in various professional</p> <p>Contact:</p> <p>Interested undergraduate or graduate students should write via EMAIL ONLY to the:</p> <p>Ad Hoc Internship Human Resources Operations Section, Human Resources Management Service, United Nations Office</p> <p>Enclosing: Applications (in English) should include the following: a) A covering letter stating the grounds for their application; b) Recent curriculum vitae (CV); c) Copies of their university degrees or a list of courses attended or attending; d) Abstracts of academic papers they have written if any.</p> <p>All applicants must be currently enrolled in undergraduate or graduate programs. No phone calls, please. After careful consideration of all documents submitted, only successful candidates will be notified of their selection.</p> <p>Kindly send the requested applicationsdocuments to the following email address: intern@unops-us.org</p>
Inici	<p>July 2015 (Deadline: 10/06/2015): Summer Session</p> <p>October 2015 (Deadline: 15/09/2015): Fall Session</p> <p>January 2016 (Deadline: 01/10/2015): Spring Session</p>
Durada	2 month basis 3 time a year (Spring Session, Summer Session, Fall Session)
Nombre de places	1
Requisits	<p>1. Applicants must be enrolled in a degree programme in a graduate school (second university degree or higher) at the time of application and during the internship.</p> <p>2. Applicants pursuing their studies in countries where higher education is not divided into undergraduate and graduate stages must have completed at least four years of full-time studies at a university or equivalent institution towards the completion of a degree.</p> <p>3. Development-related fields such as economics, international relations, anthropology, sociology, public or business administration, or environmental studies. Other fields of study may be considered</p>

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## VPIphotonics

### VPIphotonics. Berlin, Alemanya

Codi	D VPI-Berlin_1
Estudis	Pla 92, Màster, grau
Tipus d'estada	PFC, TFM, TFG
Descripció	<p><b>Forward Error Correcton for Mitigation of Cycle-Slips in Digital Coherent Transmission</b></p> <p>VPIphotonics is a globally operating provider of software products and consulting services for the design and optimization of optical telecommunications equipment and networks. We support research and planning groups, product design and marketing teams in over 100 companies as well as educators and researchers at over 140 academic institutions worldwide. In the framework of numerical modeling for simulation, analysis and optimization of optical systems and components, <i>VPIphotonics GmbH</i> offers the mentioned topic for a master thesis.</p> <p>Project: Further implementation of an existing simulation platform for Reed-Solomon, Hamming and LDPC codes to <i>BCH</i> codes. Mitigation of <i>cycle-slips</i> (phase ambiguity) using iterative decoding of <i>LDPC</i> code and <i>BCH</i> codes</p>
Inici	Summer/Fall 2015
Durada	5-6 months (bachelor around 5 months, Diploma & Master around 6/9 months)

Nombre de places	1
Requisits	Good knowledge of digital communications and coding theory, ability to work independently, good knowledge with Python or Matlab, basic knowledge of LDPC code is a plus
Compensations	A compensation will be given