

PFC a Empreses (Primavera 2007-08)



Empreses on pots fer el PFC

Empreses i Institucions que ofereixen projectes a l'ETSETB i que gestiona l'escola Última actualització: 30 Octubre 2007

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

ATENCIÓ: hi ha empreses que continuament estan ofertant projectes. Un dels requisits és que els has de sol·licitar pel teu compte, però pots demanar-nos qualsevol document que et sol·licitin i tingui a veure amb l'escola. Consulta aquí quines són.

NEC

Orange UK

CNES

SIEMENS

PHILIPS

TOSHIBA

ERICSSON

NOKIA

DLR

TriaGnoSys GmbH, Wessling-Oberpfaffenhofen, Germany

EPFL

Bosch

TILAB

NEC

NEC (Alemanya-Heidelberg)

Codi	D NEC Hei-1
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Design and evaluation of proprietary algorithms and research on future technology enhancements (e.g., 802.16 multi-hop relay) 802.16 technology (WiMAX)</p> <p>The IEEE 802.16 technology (WiMAX) is a promising alternative to 3G or wireless LAN for providing last-mile connectivity by radio link due to its large coverage area, low cost of deployment and high speed data rates. However, in order to compete with already well-established wireless technologies, WiMAX has to show that it outperforms legacy wireless technologies significantly. The student will get involved in a project which contributes to the development of NEC's WiMAX products. The main goals of the project are the design and evaluation of proprietary algorithms and research on future technology enhancements (e.g., 802.16 multi-hop relay).</p>
Durada	Starting time: Spring 2008 Duration: 6-9 months
Requisits	<ul style="list-style-type: none">Analytical skills.Fluent English.Previous experience with network simulators and/or knowledge of the 802.16 technology will be valued.C/C++/Matlab coding knowledge.
Nombre de places	1
Codi	D NEC Hei-2
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Development of the next generation of NEC's 3G/WiFi mobile phone N90iL</p> <p>3G mobile terminals are including Wireless LAN capabilities due to its popularity and the success of this technology in offering high data rates at a low cost. Currently there are two main IEEE specifications considered for future 3G/WiFi mobile phones, 802.11e and 802.11n, which define mechanisms to improve the Quality of Service, bandwidth capacity and power saving of the current WiFi chipsets. However, the proper configuration of these mechanisms as well as the design of some of the algorithms that are left open to implementors is required for delivering the desired services. The student will get involved in a project which pursues to design and configure proprietary algorithms for product differentiation of NEC's 3G/WiFi phones. The project will be performed in the framework of the development of the next generation of NEC's 3G/WiFi mobile phone N902iL.</p>

Durada	Starting time: Spring 2008 Duration: 6-9 months
Requisits	<ul style="list-style-type: none"> • Analytical skills. • Fluent English. • Previous experience with network simulators and/or knowledge of the 802.11 technology will be valued. • C/C++/Matlab coding knowledge.
Nombre de places	1
Codi	D NEC Hei-3
Data d'entrada	2008
Tipus d'estada	PFC
Descripció	<p>A Middleware for Wireless Sensor and Actuator Networks</p> <p>NEC Heidelberg has developed scalable information gathering and management architecture. Next step is the integration with Wireless Sensor and Actuator Networks (WS&AN) to handle large scale information/context sources. The goal of the thesis is to integrate wireless sensor nodes into an existing information gathering architecture and implement a small scale demonstrator. An important part of the thesis will be to work on the design of an architecture for wireless sensor nodes. The main implementation will be on an embedded wireless sensor node platform.</p> <p>Prior experiences in working with wireless sensor such platforms or general knowledge about microprocessors and electrical engineering for this topic would be helpful but not required. At least the student should have strong interest and curiosity in working with such embedded systems.</p>
Durada	Starting time: Spring 2008 Duration: 6-9 months
Requisits	<p>For all theses the candidates should have interests and/or experience in some of the areas listed below:</p> <ul style="list-style-type: none"> • Advanced programming skills in Java • Internet protocols • Knowledge in telecommunication and computer networks • Context awareness • Service and Session management • Wireless sensor nodes • Privacy issues • Ontologies and Ontology languages • good English (required!)
Nombre de places	1
Codi	D NEC Hei-4
Data d'entrada	2008
Tipus d'estada	PFC
Descripció	<p>Topic 2: Context Awareness with Public Displays</p> <p>NEC Heidelberg has developed scalable context and information gathering and management architecture. The goal of this thesis is to extend this architecture towards heterogeneous public displays. The general idea is to make public displays context-aware and programmable, i.e. recognize and react to nearby people. The student will develop an architecture for context-aware displays and implement a prototype involving different kinds and sizes of displays.</p>
Durada	Starting time: Spring 2008 Duration: 6-9 months
Requisits	<p>For all theses the candidates should have interests and/or experience in some of the areas listed below:</p> <ul style="list-style-type: none"> • Advanced programming skills in Java • Internet protocols • Knowledge in telecommunication and computer networks • Context awareness • Service and Session management • Wireless sensor nodes • Privacy issues • Ontologies and Ontology languages • good English (required!)
Nombre de places	1
Codi	D NEC Hei-5
Data d'entrada	2008
Tipus d'estada	PFC
Descripció	<p>Ensuring privacy in context aware environments</p> <p>Collecting and providing context information tackles the very sensitive area of user privacy. The wish for keeping the users privacy contradicts with his wish of getting a service provided, which needs his personal context information. Different solutions for this dilemma are possible, like, e.g., to anonymize the service access by applying virtual (anonymous) user identifications, by introducing a mediating instance which separates context related from user</p>

	related service processing or by blurring the preciseness/correctness of the provided context information (a weather service does not require the accurate position of a user). This thesis shall investigate in such privacy enabling technologies, and as a prototype implementation will complement an existing context management framework with them.
Durada	Starting time: Spring 2008 Duration: 6-9 months
Requisits	For all theses the candidates should have interests and/or experience in some of the areas listed below: <ul style="list-style-type: none"> • Advanced programming skills in Java • Internet protocols • Knowledge in telecommunication and computer networks • Context awareness • Service and Session management • Wireless sensor nodes • Privacy issues • Ontologies and Ontology languages • good English (required!)
Nombre de places	1
Codi	D NEC Hei-6
Data d'entrada	2008
Tipus d'estada	PFC
Descripció	Topic 4: Mobile Social Networking Services (SNS) Facebook or MySpace have popularized social networks and their associated services. This trend, however, has yet to permeate the mobile market. The objective of this thesis is to further investigate the possibilities of Mobile Social Networks, exploiting parameters such as physical friend proximity or, on a broader scope, the user's contextual information. The envisioned client would work on a high-end mobile phone, and stress the use of available peripherals and sensors, communicating over WiFi, Bluetooth and NFC technologies, to enable friends to interact with their social network in real-time, rather than the current maintenance/digest approaches. The thesis should be completed with the implementation of a proof-of-concept demonstrator.
Durada	Starting time: Spring 2008 Duration: 6-9 months
Requisits	For all theses the candidates should have interests and/or experience in some of the areas listed below: <ul style="list-style-type: none"> • Advanced programming skills in Java • Internet protocols • Knowledge in telecommunication and computer networks • Context awareness • Service and Session management • Wireless sensor nodes • Privacy issues • Ontologies and Ontology languages • good English (required!)
Nombre de places	1

[inici de pàgina](#) 

Orange UK

Codi	Orange UK
Data d'entrada	February 2008
Tipus d'estada	PFC
Descripció	Access Network Design/ Radio Harware team The student will contribute to ensure the compliance to technical specifications and agreed end to end network performance of Access Network systems and equipment in order to aid the decision making process with regards to roll out across the OUK network
Durada	Starting time: February 2008 Duration: 6 months
Requisits	Knowledge/Skills/Experience - Understanding of UMTS/BSS/UMA architecture and standards - English language Behaviours - Adaptability - Teamwork
Nombre de places	1

CNES**CNES (França-Toulouse)**

Codi	F CNES TOU-1
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Radionavigation signal analysis</p> <p>With the creation of new radionavigation satellite systems and the modernization of others, new signals will be emitted very soon. It is necessary to analyse the broadcast signal to assess future performance of these systems or to detect possible emission anomalies. Analysis can be performed by signal processing in frequency or time domain. This analysis is made difficult as radionavigation signals are well below the noise floor. Various means have to be conducted : high gain antenna (not always available) or advanced signal processing with classical antennas.</p> <p>The objective here is to develop, test and validate signal processing algorithms applied to radionavigation signal analysis. They will be developed using Matlab and language C.</p>
Durada	Starting time: Spring 2008 Duration: 6 months
Requisits	Signal Processing, Radionavigation, Matlab, language C
Nombre de places	1

SIEMENS**SIEMENS (Alemanya-Lindau)**

Codi	D SIEMENS LIN-1
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Multivariate Statistical Analysis in Radar-Based Advanced Driver Assistance Systems</p> <p>Im Rahmen dieser Diplomarbeit soll ein Klassifizierungsalgorithmus basierend auf die Multivariate Statistical Analysis entwickelt werden. Die Klassifikation und Warnstrategie einer bereits bestehenden Radar-Applikation dient dabei als Ausgangspunkt. Dieser neue Ansatz soll unter anderem die Radar-Erkennung von Leitplanken und statischen Objekten in Stadtumgebungen und deren Unterscheidung von bewegten Fahrzeugen noch weiter verbessern.</p> <p>Im ersten Schritt sind die relevanten Observablen aus dem bestehenden Algorithmus zu extrahieren und in geeigneter Weise einer Multivariate Statistical Analysis zu unterziehen. Basierend auf diese Ergebnisse lässt sich ein optimierter Algorithmus formulieren.</p> <p>Abschließend wird die Qualität des Klassifikationsalgorithmus mit Hilfe einer bestehenden Datenbank von aufgenommenen Daten aus realistischen Straßentests überprüft.</p>
Durada	Starting time: Spring 2008 Duration: 6-9 months
Requisits	<ul style="list-style-type: none"> - C - MS-Office - Deutsch und Englisch in Wort und Schrift - Qualifikationen in statistischer Datenanalyse wünschenswert.
Nombre de places	1
Codi	D SIEMENS LIN-2
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Fuzzy Logic based Analysis in Radar-Based Advanced Driver Assistance Systems</p> <p>Im Rahmen dieser Diplomarbeit soll ein Klassifizierungsalgorithmus basierend auf die Multivariate Statistical Analysis entwickelt werden. Die Klassifikation und Warnstrategie einer bereits bestehenden Radar-Applikation dient dabei als Ausgangspunkt. Dieser neue Ansatz soll unter anderem die Radar-Erkennung von Leitplanken und statischen Objekten in Stadtumgebungen und deren Unterscheidung von bewegten Fahrzeugen noch weiter verbessern.</p> <p>Im ersten Schritt sind die relevanten Observablen aus dem bestehenden Algorithmus zu extrahieren und in geeigneter Weise einer Multivariate Statistical Analysis zu unterziehen. Basierend auf diese Ergebnisse lässt sich ein optimierter Algorithmus formulieren.</p> <p>Abschließend wird die Qualität des Klassifikationsalgorithmus mit Hilfe einer bestehenden Datenbank von aufgenommenen Daten aus realistischen Straßentests überprüft.</p>
Durada	Starting time: Spring 2008 Duration: 6-9 months

Requisits	<ul style="list-style-type: none"> - C - MS-Office - Deutsch und Englisch in Wort und Schrift - Qualifikationen in statistischer Datenanalyse wünschenswert.
Nombre de places	1

[inici de pàgina](#) 

PHILIPS

PHILIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-1
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Colour control of LED lamps</p> <p>The light of coloured light emitting diodes (LEDs) can be mixed to provide light sources with adjustable colour, including both saturated colours and white. However, reproducibility and stability issues require using feedback control schemes to meet colour accuracy requirements.</p> <p>Using custom in-house developed driver and sensor boards, we have set up a MATLAB / Simulink / dSPACE based rapid control prototyping environment for investigating colour control concepts. In conjunction with this, control algorithms have to be implemented and driver and sensor electronics has to be developed.</p>
Durada	Starting time: as soon as possible Duration: 6 months
Requisits	<ul style="list-style-type: none"> -basic knowledge in control, power electronics and sensors -familiar with MATLAB and Simulink -practical skills to measure and to set up circuits -high motivation and good English skills
Nombre de places	1

Codi	D PHILIPS Aac-2
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Automation of a LED colour control prototyping environment</p> <p>The light of coloured light emitting diodes (LEDs) can be mixed to provide light sources with adjustable colour, including both saturated colours and white. However, reproducibility and stability issues require using feedback control schemes to meet colour accuracy requirements.</p> <p>We have set up a MATLAB / Simulink / dSPACE based rapid control prototyping environment for investigating colour control concepts. Both the control and calibration procedure are essential for the colour accuracy that can be achieved. In this project the operation of the prototyping environment shall be automated in order to investigate calibration procedures.</p>
Durada	Starting time: as soon as possible Duration: 6 months
Requisits	<ul style="list-style-type: none"> -basic knowledge in control, power electronics and sensors -familiar with MATLAB and Simulink -readiness to become acquainted with supportive software (e.g. Visual basic, LabView) -high motivation and good English skills
Nombre de places	1

Codi	D PHILIPS Aac-3
Data d'entrada	30/10/07
Tipus d'estada	PFC

Descripció	<p>Connected Book</p> <p>During the past decades the digitalization of texts transformed our reading experience by facilitating retrieval and rendering of information. As an example, hyperlinks facilitated a drill-down reading dimension that used to be cumbersome before digitalization, thus allowing readers to easily adjust his or her level of information detail.</p> <p>As digital texts is increasingly accessed via mobile devices and wireless connectivity is featured in many objects of our environment, new opportunities exist for improving the reading experience. In the same way hyperlinks created a web connecting digital documents; it is now possible to create a web where words are tied to parameters of different objects in the environment. In doing so, customized atmospheres(light, sounds, temperature) can be created that reflects aspects of the text being read and a more immersive experience is expected to ensue. The aim of this project is to create the infrastructure that allows mobile reading devices to actuate lights for ambient generation.</p>
Durada	<p>Starting time: as soon as possible</p> <p>Duration: 6 months</p>
Requisits	Skills: Linux, Socket Programming, Visual Basic, DMX.
Nombre de places	1
Codi	D PHILIPS Aac-4
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>ZigBee Mobility for Alert Systems.</p> <p>ZigBee is an open standard for wireless communication that uses small, bidirectional and low-power digital radios. ZigBee is aimed primarily at control applications in which topological changes are occasional and thus provides no mechanism for the level of mobility needed by certain alarm systems. The aim of this project is to design and implement a communication service for ZigBee networks able to efficiently accommodate transmission of messages to mobile nodes in certain classes of alarm systems. The service will facilitate asynchronous exchange of messages thus allowing mobile nodes to join and leave the network as required.</p>
Durada	<p>Starting time: as soon as possible</p> <p>Duration: 6 months</p>
Requisits	Skills: ZigBee specification, .NET (C#), C++, embedded systems programming.
Nombre de places	1
Codi	D PHILIPS Aac-5
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>ZigBee-Based 3D Localization for Alert Systems</p> <p>ZigBee is an open standard for wireless communication that uses small, bidirectional and low-power digital radios. The newest generation of commercial ZigBee transceivers includes localization engines that are able to define the position of an object in a 2D plane. In certain classes of alert systems this is not sufficient, as the occurrence of an event needs to be pinpointed in a multi-floor building. The aim of this project is to design and implement a ZigBee-based 3D localization system for such a class of alarm systems.</p>
Durada	<p>Starting time: as soon as possible</p> <p>Duration: 6 months</p>
Requisits	Skills: ZigBee specification, localization techniques, C++, embedded systems programming.
Nombre de places	1
Codi	D PHILIPS Aoc-6
Data d'entrada	Spring 2008
Tipus d'estada	PFC

Descripció	Combining IEEE 802.11 mesh networking with IEEE 802.15.4 short range radios for ubiquitous health monitoring Evaluate how ubiquitous health monitoring can benefit from IEEE 802.11s-like mesh networking capabilities. We envisage patient-worn devices (PWD) comprising both IEEE 802.11s and IEEE 802.15.4 for providing seamless connectivity between smart body-worn wireless sensors (such as ECG, blood pressure, oxygen saturation) and the WLAN-based infrastructure for patients during transport and while ambulating. The ad-hoc mesh networking feature of IEEE 802.11s allows using PWDs as intermediate hops for range extension and as backup link. The final project comprises besides conceptual considerations also practical validation of the developed concepts on an IEEE 802.15.4 / IEEE 802.11s testbed.
Durada	Starting time: Spring 2008 Duration: 6 months
Requisits	- Interest in and knowledge of wireless ad hoc networking and distributed systems - Experience in Java or C# programming - Fluent in oral and written English
Nombre de places	1

PHILIPS (Holanda-Eindhoven)

Open positions

[inici de pàgina](#)

TOSHIBA

TOSHIBA (Japó-Kawasaki)

Codi	J TOSHIBA KAW-1
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	The project will be in the area of speech recognition or speech synthesis. The precise topic will depend on the interests and skills of the selected student. Dr Masami Akamine, Toshiba Research Fellow will supervise the project within the Multimedia Lab. Areas of interest to Toshiba at this time include environment aware processing leading to more robust recognition, novel acoustic modelling for speech recognition and expressive speech synthesis. http://www.toshiba.co.jp/rdc/index.htm http://www.toshiba.co.jp/rdc/mmlab/index_e.htm
Durada	Starting time: April starting date preferred but start date is flexible Duration: 6-12 month
Requisits	Would suit a EE/CS student with a knowledge of pattern processing. Speech experience helpful but not essential. Should be good C/C++ programmer. Must be able to communicate well in English, both orally and in written form.
Nombre de places	1

[inici de pàgina](#)

ERICSSON

ERICSSON (Alemania-Herzogenrath)

Codi	D ERICSSON Her-1
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	Design and evaluation of radio resource control protocols allowing for cooperative MIMO communication Our research group is developing key technologies for future cellular networks based on LTE (LTE Advanced). One particular focus is directed to innovative multi-antenna techniques that leverage multi-cell cooperation. Such techniques form virtual antenna arrays out of antennas that are physically deployed at different sites. By controlling the antennas cooperatively, inter-cell interference can be reduced, multiple streams can be transmitted, or the robustness of the transmission can be improved. These cooperative techniques have the potential to boost the spectral efficiency of cellular networks. The major challenge is the effective and efficient cooperation of distant stations and this is where you will be involved. Your task will be the design and specification of protocols that allow exchanging necessary signaling messages, channel state information, and user data. Both the air interface and the backbone will be involved. You will prototypically implement promising candidate features in our radio network simulator. By means of computer simulations you will gain performance measures that will finally show the benefit of the developed techniques.
Durada	Starting time: February 2008 Duration: 6 months
Requisits	-strong background in wireless communications (OFDM) -computer and programming skills (Matlab, Java)

Nombre de places	1
Codi	D ERICSSON Her-2
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Development and evaluation of an efficient air interface enabling multi-hop operation</p> <p>Our research group is developing key technologies for future cellular networks based on LTE (LTE Advanced). These networks shall provide very high capacity as well as wide area coverage. In conventional radio networks, these goals are contradictory. By changing the paradigm of a single-hop radio transmission to allow for a multi-hop architecture, future cellular networks could offer both, capacity and coverage.</p> <p>The major challenge is to enhance the existing LTE control signaling as well as to develop a radio resource control that ensures an effective multi-hop operation. During your internship, you will be involved in both. In order to evaluate the developed control algorithms you will enhance our radio network simulator with multi-hop capabilities. By means of computer simulations you will gain measures that will show the performance of the developed solution.</p>
Durada	Starting time: February 2008 Duration: 6 months
Requisits	-strong background in wireless communications (OFDM) -computer and programming skills (Matlab, Java)
Nombre de places	1
Codi	D ERICSSON Her-3
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Development of a low-complexity watermarking system for IPTV</p> <p>Recently there is a tendency among media companies and media service providers to distribute their services and content without DRM protection, but using digital watermarking instead. Often, it is a requirement to embed a watermark that is individual per receiver. For downloadable content like images and small music clips, this is possible with limited complexity, especial when not many receivers have to be served at the same time. However, for mass distribution services like IPTV, and for live media, individual watermarking is not feasible if it requires a lot of processing. In this work, a method shall be investigated and implemented in which several (but few) versions of audiovisual streams are pre-watermarked. The real user-specific watermarking is done by switching between the pre-watermarked versions; the identifying code is then encoded into the switching pattern. The pre-watermarked versions shall be simulcasted to a network node as close as possible to the end user (e.g. a BRAS or a DSLAM in the IPTV network), and mixed there to receive the final user-specific version for the transmission on the last hop. As an extension, the video streams and the watermarks can be transmitted using multiple an extension scalable coding, where the video itself is encoded as The work includes theoretical concept development and investigations as well as a demo implementation.</p>
Durada	Starting time: February 2008 Duration: 6 months
Requisits	-video coding -programming skills
Nombre de places	1
Codi	D ERICSSON Her-4
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Extension of the Secure Real-Time Transport Protocol (SRTP) for Storage and playback</p> <p>The Secure Real-Time Transport Protocol (SRTP) External link mark (RFC 3711) is an IETF protocol for the encrypted unreliable transport of real-time media. It has been detected that a drawback of SRTP compared to similar transport protocols like ISMACryp is that it is not directly possible to store SRTP streams for later playback, due to the fact that SRTP was designed for communications applications. Storage and later playback is however required for many multimedia distribution applications. This work shall investigate what is missing to be able to store SRTP streams and replay them later, compared to other protocols e.g. ISMACryp. A concrete proposal shall be worked out what would need to be specified in standards bodies (IETF) to alleviate this problem. The goal of this work is to standardize an extension of SRTP that allows direct storage and later playback. As a proof of concept, the extended SRTP shall be implemented on both server and client side.</p>

Durada	Starting time: February 2008 Duration: 6 months
Requisits	-video transport. security -programming skills
Nombre de places	1
Codi	D ERICSSON Her-5
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Use cases for the "network of information"</p> <p>Within the context of Future Internet research, the concept of Network of Information plays a vital role. It enables addressing information elements or content directly, instead of e.g. addressing a web server (http://www.ericsson.com) as it is done today. The fact that the network layer does not only see an end-to-end bitstream, but directly works with the information elements opens the door for a wide range of optimizations and innovations in today's networks. To better understand potential use cases for this technology, we are studying content distribution mechanisms in a wide array of state-of-the-art and upcoming networks, and try to identify areas where the introduction of this new networking paradigm can be beneficial. The work focuses on theoretical analysis of the above issues (exact scope to be set in cooperation with the student). Depending on the scope of the work and the results of the analysis, further quantitative evaluations by means of simulation or analytic methods can be required. For the student, this work gives the opportunity to get an impression of the coming topics of tomorrow's Internet technologies and their future fields of application.</p>
Durada	Starting time: February 2008 Duration: 6 months
Requisits	-good understanding of Internet protocols -optionally experience with simulations
Nombre de places	1
Codi	D ERICSSON Her-6
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Graceful degradation for wireless video broadcast using scalable video coding and unequal loss protection</p> <p>While wireless broadcast distribution is efficient in terms of resource usage for simultaneous video transmission to multiple users, it does not allow for individual adaptation according to reception characteristics of single users, and retransmissions in case of transmission errors are not possible. As an alternative, application layer forward error correction can be used to increase the error robustness in such systems. Forward error correction codes are optimized for certain loss scenarios, thus the media quality may break down dramatically if the expected loss rate is exceeded, while they become inefficient in case the loss rate is much lower than expected. A promising solution to this problem is to use layered/scalable media coding techniques such as the scalable extension of the H.264/AVC video coding standard, and apply unequal error protection (UEP) according to the relative importance of the respective layers. This enables graceful degradation of the media quality in case of increasing loss rates. The objective of this work is to investigate the relationship of source coding, transport and protection parameters in order to optimize the system performance.</p>
Durada	Starting time: February 2008 Duration: 6 months
Requisits	-video transport -error protection -video coding -programming skills
Nombre de places	1
Codi	D ERICSSON Her-7
Data d'entrada	30/10/07
Tipus d'estada	PFC

	<p>Backward compatible introduction of high quality video broadcast services using H.264/AVC scalable video coding</p> <p>Due to its excellent coding efficiency as compared to earlier video coding standards, H.264/AVC has been adopted in many applications from wireless and wired video broadcasting, streaming, and video conferencing to video storage. Recently, the specification of the scalable video coding extension of H.264/AVC (SVC) has been finalized. It allows for bandwidth efficient representation of multiple spatial, temporal, and quality resolutions in a single compressed bit stream. SVC is thus a promising technology to allow for bandwidth efficient backward compatible introduction of high quality video broadcasting services (e.g. 1080p HDTV broadcast) based on existing H.264/AVC based systems (e.g. 576i SDTV broadcast). The objective of this work is to investigate the application of SVC for backward compatible introduction of high quality video services in broadcast systems (satellite, terrestrial, cellular), including evaluation and optimization of video coding and transport aspects.</p>
Durada	Starting time: February 2008 Duration: 6 months
Requisits	-video coding -video transport -programming skills
Nombre de places	1
Codi	D ERICSSON Her-8
Data d'entrada	30/10/07
Tipus d'estada	PFC
	<p>Layered protection of video content using scalable video coding</p> <p>Scalable video coding provides the means to encode video content in multiple layers enabling a gradual enhancement of the video quality depending on the number of transmitted and decoded layers. One application of scalable video coding is the transmission of standard definition TV (SDTV) and high-definition TV (HDTV) or QVGA (e.g., for MobileTV?) and VGA within a single encoded stream. Commonly, content protection mechanisms are used to restrict access to a video stream to subscribed users. The two techniques mentioned afore shall be combined in this thesis. The goal is to be able to restrict access to the different layers. The thesis consists of two parts, a theoretical phase analyzing the requirements and practical phase aiming at a prototype implementation.</p>
Durada	Starting time: February 2008 Duration: 6 months
Requisits	-security -video coding -programming skills -prototyping
Nombre de places	1
Codi	D ERICSSON Her-9
Data d'entrada	30/10/07
Tipus d'estada	PFC
	<p>Extension of IMS database solutions enabling context aware and personalized decisions in the network</p> <p>The IP Multimedia Subsystem (IMS) is an architectural framework for delivering Internet Protocol (IP) multimedia to mobile users and to allow mobile network operators as well as Internet Service Providers (ISP) an easy deployment of new applications in a standardized way. It was originally designed by the wireless standards body 3rd Generation Partnership Project (3GPP), and is part of the vision for evolving mobile networks beyond 3G. Extensions of the IMS are desirable with respect to delivering more satisfying services to the end user and to minimizing OPEX of network operators. Multimedia content delivered by an IMS should be tailored to the respective user scenario considering resource usage and end user satisfaction. This work shall investigate a way to achieve this goal by making use of context information already available in various places of the network. Examples of context are mobility of the user, type of access or mobility of a session (e.g. from one device to another). Based on these information, the network can make intelligent decisions regarding the delivery of the content. The work shall further investigate scalable negotiation algorithms processing the gathered information. An analysis of existing solutions and standards shall also be done as part of the work. Based on this analysis, suggestions for implementations of the proposed enhancements shall be made.</p>
Durada	Starting time: February 2008 Duration: 6 months

Requisits	-Java programming -SQL
Nombre de places	1

[inici de pàgina](#) 

NOKIA

NOKIA (Dinamarca-Aalborg)

Codi	DK NOKIA Aal-1
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>An Investigation of Relaying in Cellular Networks</p> <p>The ever increasing minimum data rate targets of future mobile networks such as the Long Term Evolution of UMTS (LTE for short) makes it difficult to guarantee the target data rates by using the conventional cellular framework with a central base station serving all the users within a cell. This is mainly due to the fact that the high data rate transmission requires higher power levels. The use of relaying where a low cost "base station" is used to relay the data to users not having a good link is one of the proposed methods in order to mitigate this problem [1]. Figure 1 shows an illustration of this concept.</p>
Durada	Starting time: February 2008 Duration: 8 months
Requisits	For the study, a good background in mobile communications is required. This includes knowledge about radio propagation and cellular systems. Furthermore, an experience in developing/using system level simulators is beneficial. The project requires an extension of existing simulation tool which calls for good programming skills in MATLAB.
Nombre de places	1

Codi	DK NOKIA Aal-2
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Iterative detection and decoding for OFDM-MIMO in LTE downlink</p> <p>3GPP is currently finalizing the standardization of Rel `8, named UTRA long term evolution (LTE). Multi-antenna techniques (MIMO) applied to a multi-carrier air interface will be one of the key features that will allow a significant increase of the spectral efficiency with respect to previous releases. The standard proposes the use of both single user (SU-) and multi user (MU-) MIMO. In SU-MIMO, a user can receive up to 4 different spatially-multiplexed data streams in the same physical resource, whilst in MU-MIMO different users are multiplexed in the space-domain over the same physical resources.</p> <p>In order to take fully advantage of this spatial diversity at the mobile receiver, high performance algorithms for detection of the different spatial data streams will be required. The project focuses in the study of iterative algorithms for detection and decoding of the different data streams sent from the base-station to the user equipment. The influence of different aspects such as channel spatial correlation, differences in power in each receiver branch or selection of pre-coding weights will be investigated. Furthermore, the interaction with other LTE features, such as hybrid automatic repeat request (H-ARQ) or link adaptation (LA) may also be studied.</p>
Durada	Starting time: February 2008 Duration: 8 months
Requisits	Solid background in digital communications, signal processing, stochastic processes and programming (MATLAB)
Nombre de places	4-6

Codi	DK NOKIA Aal-3
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Adaptative Spatial Processing-Aided Spectrum Sharing for IMT-A Systems</p> <p>The system requirements for the next generation of mobile communication systems called IMT-Advanced (IMT-A) are currently being specified by the ITU. One major and new aspect in IMT-A compared to the existing IMT-2000 (e.g. UMTS) is the allocation of new frequency bands for the high bandwidth communication systems (e.g. UTRAN LTE). In order to provide optimal performance and QoS in terms of user throughput and spectrum utilization the available radio spectrum allocations will have to be shared between the operators.</p>
Durada	Starting time: February 2008 Duration: 8 months

Requisits	Background in communication theory (MIMO, OFDM), digital signal processing, stochastic processes and skills in MATLAB.
Nombre de places	4-6
Codi	DK NOKIA Aal-4
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Spectrum Sharing and Radio Resource Management in Distributed Networks for Next Generation Wireless Communication Systems</p> <p>The next generation wireless communication systems such as IMT-A are expected to provide very high data rates (in the order of 100 Mbps for wide area and 1 Gbps for local area) in heterogeneous environments with diverse QoS requirements of the users. This demands high bandwidth allocation as well as high spectral efficiency. Spectrally efficient techniques such as OFDM, MIMO have been investigated in the recent past, but methods to efficiently coordinate resources allocation in a dynamic way, which would allow to further improve the spectral efficiency, are currently a hot research topic. It is expected that the next generation system requirements will be achieved by heterogeneous wireless architecture and dynamic spectrum access techniques. This will require flexible spectrum allocation between the operators of different radio access networks, with opportunistic management of radio resources. Therefore proper coordination between different operators, networks and technologies will be an essential and challenging task.</p> <p>There are currently many ongoing architectural design attempts for the next generation wireless systems; however there is a clear trend toward the distributed architecture due to faster decisions, lower signalling overhead, flexible adaptation and its suitability for heterogeneous environment. In this approach the nodes/terminals take decision based on the local information available. This envisages the requirement of cooperative approach among the nodes, achievable by the cognitive support. There exist several research challenges due to the broad range of available spectrum, to the heterogeneity of the wireless environment, and to the diverse QoS requirements. An effective Radio Resource Management and Spectrum Sharing will be essential to achieve these requirements.</p> <p>This project aims to develop a suitable mechanism to establish coordination between different radio access networks forming a composite wireless environment, to dynamically allocate the spectrum and jointly manage the radio resources, in order to meet the requirements envisaged by the next generation communication systems.</p>
Durada	Starting time: February 2008 Duration: 8 months
Requisits	Good background in digital communications, mobile communication, stochastic processes and programming (MATLAB and C++)
Nombre de places	4-6
Codi	DK NOKIA Aal-5
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Uplink Downlink Resource Split Optimisation for LTE TDD</p> <p>An inherent gain mechanism of TDD mode is that the system may make uneven allocations to uplink and downlink traffic within a given deployment bandwidth. E.g. if a network is heavily downlink oriented, more of the system resources can be allocated to the downlink. When the system is optimized for 100% utilization in both uplink and downlink, less spectrum is needed to carry a certain load compared to e.g. static and even uplink/downlink partition in e.g. LTE FDD. However due to the obvious interference issues, the downlink/uplink resource split needs to be the same for cells, which interfere each other, so the optimal downlink/uplink resource split is not obvious.</p> <p>Objectives</p> <p>The main objective of this project is to investigate the performance of optimisation of the downlink/uplink resource split for LTE TDD:</p> <ul style="list-style-type: none"> · What is the potential gain under different traffic distribution assumptions? · How can this be achieved? · What kind of measurements, commands and algorithms can be used? · How much performance gain, in terms of delay, capacity and coverage, can be achieved compared to a fixed resource distribution? · What is the overhead of the proposed solutions (signalling overhead, complexity, etc...)?
Durada	Starting time: February 2008 Duration: 8 months
Requisits	For the study, a good background in mobile communications is required. This includes knowledge about cellular systems and traffic modelling. Furthermore, an experience in developing/using simulators (based on Matlab or C/C++) is beneficial.
Nombre de places	4-6

Codi	D DLR MUNICH -1
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Resource Management for Heterogeneous Networks</p> <p>In future aeronautical communication several links like satellite links, VHF links or optical links will be available for communication. In an environment where several heterogeneous wireless links are available at the same time a decision is necessary which link or which set of links shall be used for transmission. The presence of different links at the same time also allows optimization of the transmission by means of path coding. Here one link can provide redundancy for the other links. A decision algorithm is hence required which decides about the links to be used and the amount of redundancy required to meet certain QoS requirements. Within this work the formulation and optimization of such a decision function shall be investigated which considers networking factors as link delay, throughput, packet loss but also things like financial cost for using a link. Moreover it shall be investigated which coding mechanisms are suitable to be applied for path coding in this environment. The performance of the developed solutions shall be assessed by means of simulations and the results be reported.</p>
Durada	Starting time: Spring 2008 Duration: 6 months
Requisits	<ul style="list-style-type: none"> - Knowledge of radio communications systems and communications networks - Matlab, C++ - Knowledge of networking and coding (path coding) would be useful - Background knowledge of satellite communications desired - Fluency in English
Nombre de places	1
Codi	D DLR MUNICH-2
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Routing and Signalling for Low Earth Orbit Satellite Constellation Networks</p> <p>Low earth orbit (LEO) satellite constellations are dynamic networks consisting of a highly dynamic access segment and a quasi-static core topology. The regular movement of the constellation is the reason for both continuously changing lengths of inter-satellite links and handovers between serving satellites and terminals for air passenger communications within aircraft, but unlike with ad-hoc networking it is possible to predict future topology properties in order to achieve a high degree of persistence of connections.</p> <p>Subject of this work is (i) to study the sensitivity of the envisaged network regarding different passenger user profiles, (ii) to compare a reference LEO constellation with a geostationary scenario regarding spot beam handovers, (iii) to estimate signalling traffic load for the LEO constellation, and (iv) to apply and enhance existing routing algorithms in order to achieve maximum link utilisation with a minimum number of handovers.</p> <p>The work is based on the results of an earlier Master Thesis.</p> <p>Students are encouraged to bring in their own ideas and approaches, and the focus of a thesis can be adjusted to the personal interests (simulation, algorithms, theoretical considerations, etc.).</p>
Durada	Starting Time: Spring 2008 Duration: 6 months
Requisits	<ul style="list-style-type: none"> - Basic background of communications systems and communications networks - Basic knowledge Matlab - Interest in networking, routing and protocols - Fluency in English
Nombre de places	1
Codi	D NEC Hei-5
Data d'entrada	30/10/07
Tipus d'estada	PFC
Descripció	<p>Ensuring privacy in context aware environments</p> <p>Collecting and providing context information tackles the very sensitive area of user privacy. The wish for keeping the users privacy contradicts with his wish of getting a service provided, which needs his personal context information. Different solutions for this dilemma are possible, like, e.g., to anonymize the service access by applying virtual (anonymous) user identifications, by introducing a mediating instance which separates context related from user related service processing or by blurring the preciseness/correctness of the provided context information (a weather service does not require the accurate position of a user). This thesis shall investigate in such privacy enabling technologies, and as a prototype implementation will complement an existing context management framework with them.</p>
Durada	Starting time: Spring 2008 Duration: 6-9 months
Requisits	<p>For all theses the candidates should have interests and/or experience in some of the areas listed below:</p> <ul style="list-style-type: none"> • Advanced programming skills in Java (or C# for topic 1) • Internet protocols • Knowledge in telecommunication and computer networks

- Context awareness
- Service and Session management
- Wireless sensor nodes (esp. for topic1)
- Privacy issues (esp. topic 3)
- Ontologies and Ontology languages
- good English (required!)

Nombre de places

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TriaGnoSys GmbH, Wessling-Oberpfaffenhofen, Germany

Open Positions

Codi	D TriaGnoSys Wess-1
Data d'entrada	Spring 2008
Tipus d'estada	PFC
Descripció	<p>Mobility Solutions for Air Traffic Management (ATM) Networks</p> <p>The concrete works to be performed include the following (not preventing adaptations and flexible reaction to lessons learnt while performing the work):</p> <ul style="list-style-type: none"> • Study related literature and IETF RFC related to host/network mobility, with particular emphasis on their applicability in aeronautical communications environment and air traffic management (ATM) • Generate ideas/proposal for mobility solution in air traffic management networks • Perform analytical evaluation of the proposed ideas • Implementation of the proposed idea, possibly in a satellite test-bed/emulator environment.
Durada	Starting time: Spring 2008 Duration: 6 months
Requisits	Requirements: - Matlab - C/C++ programming
Nombre de places	1

Codi	D TriaGnoSys Wess-1
Data d'entrada	Spring 2008
Tipus d'estada	PFC
Descripció	<p>Satellite Communication Management Using (SI-SAP)</p>
Durada	Starting time: Spring 2008 Duration: 6 months
Requisits	Requirements: - Matlab - C/C++ programming
Nombre de places	1

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EPFL

Codi	CHEPFL Lau-1
Data d'entrada	Spring 2008
Tipus d'estada	PFC
Descripció	<p>Rate allocation in peer-to-peer networks</p> <p>Traditional approaches for allocating the bandwidth among the users of peer-to-peer and ad-hoc networks are recently been challenged. Collaborative and non-collaborative solutions have been proposed to maximize the utility of the transmission system and offer robustness to changes in the network infrastructure. Collaborative algorithms are based on the "willingness to pay" of each network user and users try to jointly maximize the system utility, while in non-collaborative system each user separately try to improve its utility.</p> <p>The aim of this project is to develop novel techniques for efficient rate allocation. Both collaborative and non-collaborative approaches will be considered. The proposed algorithms will take advantage of the recent developments in game theory. The algorithms will be evaluated for video transmission.</p>

Durada	Starting time: Spring 2008 Duration: 6 months
Requisits	Requirements: - Matlab - C/C++ programming - basic knowledge about graph theory and game theory - network protocols and p2p paradigms.
Nombre de places	1

Codi	CHEPFL Lau-2
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Data d'entrada	Spring 2008
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Tipus d'estada	PFC
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Descripció	<p>Coding of omnidirectional images</p> <p>Spherical or omnidirectional images generally provide a full 360 x 360 degrees view of a 3-dimensional scene. They describe the light field in its natural radial form, and allow to avoid Euclidian approximations which generally introduce distortion problems in computer vision algorithms.</p> <p>Whether they are natural images, acquired by an omnidirectional camera, or synthetic images, they however generally carry a huge amount of information, creating a necessity for an efficient compression scheme for transmission and storage.</p> <p>This project aims at exploring the structure of multiresolutional representations of spherical data (Spherical Laplacian pyramid, Spherical frames) and proposing a progressive and efficient coding scheme which exploits not only correlation of data within a resolution. but also between successive resolution in hierarchical decompositions.</p>
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Durada	Starting time: Spring 2008 Duration: 6 months
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Requisits	Requirements: - image processing - information theory basics - programming skills.
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Nombre de places	1
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Codi	CHEPFL Lau-3
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Data d'entrada	Spring 2008
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Tipus d'estada	PFC
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Descripció	<p>Distributed coding of the plenoptic function</p> <p>Distributed source coding, also called Slepian-Wolf coding or Wyner-Ziv coding in the lossy case refers to coding of correlated sources without any communication between sources. Although these sources do not communicate, it is still possible to encode them using less rate than the sum of their entropies. Slepian and Wolf showed in early 70's that the theoretical lower bound of this rate is equal to the joint entropy of these sources. However, the practical schemes for distributed source coding only appeared a few years ago, when it was realized that the statistical dependency between sources can be modeled by a virtual ?correlation channel? and that various channel coding schemes can be employed. Since then, DSC has become a very active area of research, governed by the need for low-complexity encoders, especially in sensor networks applications.</p> <p>The aim of this project is to study different channel coding schemes within the DSC framework, with the emphasis on turbo and LDPC codes. As for the experimental part of the project, the performance of these schemes will be evaluated on correlated natural spherical images.</p>
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Durada	Starting time: Spring 2008 Duration: 6 months
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Requisits	Requirements: - image processing - information theory basics - programming skills.
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Nombre de places	1
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They have many other proposals on their webpage, <http://lts4www.epfl.ch/sprojects.php> . They are basically active in image processing, image analysis and image communications, and have many recent and timely project proposals that could be interesting.

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Bosch

Codi	D BOSCH Hil- 2
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Data d'entrada	Spring 2008
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Tipus d'estada	PFC
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Descripció	<ul style="list-style-type: none"> - Evaluation / implementation of state-of-the-art methods for the extraction of planes (e.g. the road ahead the vehicle) from disparity images. - The work aims at implementing promising methods as robust real-time software modules and evaluating them using image sequences as well as an experimental
Durada	<p>Starting time: Spring 2008 Duration: 6 months</p>
Requisits	<ul style="list-style-type: none"> - Bachelor of Science in Information Technology, Telecommunications Engineering, Electronics Engineering, Physics or comparable fields of study. - Excellent programming skills in C++ and Matlab. - Appropriate prior knowledge in the field of digital image processing and especially stereo vision. - Enthusiasm for mathematical / theoretical problems
Nombre de places	1

Codi	D BOSCH HiI- 1
Data d'entrada	Spring 2008
Tipus d'estada	PFC
Descripció	<p>The OFDM Modulation scheme is the basis for modern communication and broadcast standards like WIMAX, DAB, DVB. Different carrier modulation (QPSK, QAM) are combined with channel codes.</p> <p>Research results shows a performance gain by combining iteratively differential demodulation and channel decoding by principles of the "Turbo Coding" approach. The approach shall be tested for the DAB Version of the OFDM scheme. Here a DQPSK is used in combination with a convolutional code. A detailed system simulation has to be realised in a Matlab environment.</p> <p>A SOVA viterbi decoder has to be realised and the necessary iteration steps.</p> <p>The performance of the scheme shall be tested in ideal and real channel conditions.</p>
Durada	<p>Starting time: Spring 2008 Duration: 6 months</p>
Requisits	
Nombre de places	1

Codi	D BOSCH HiI- 3
Data d'entrada	Spring 2008
Tipus d'estada	PFC
Descripció	<ul style="list-style-type: none"> - Evaluation / implementation of state-of-the-art methods for the extraction of planes (e.g. the road ahead the vehicle) from disparity images. - The work aims at implementing promising methods as robust real-time software modules and evaluating them using image sequences as well as an experimental vehicle
Durada	<p>Starting time: Spring 2008 Duration: 6 months</p>
Requisits	<ul style="list-style-type: none"> - Bachelor of Science in Information Technology, Telecommunications Engineering, Electronics Engineering, Physics or comparable fields of study. - Excellent programming skills in C++ and Matlab. - Appropriate prior knowledge in the field of digital image processing and especially stereo vision. - Enthusiasm for mathematical / theoretical problems
Nombre de places	1

Codi	I TILAB Tor-1
Data d'entrada	Primavera 2008
Tipus d'entrada	PFC
Descripció	<p>Implementing Service Delivery Platforms via Web Services</p> <p>One of the cornerstones of Web services interoperability is the SOAP (Simple Object Access Protocol). SOAP is essentially a way of performing a synchronous RPC (Remote Procedure Call) across the Internet over an HTTP connection. However, performing a synchronous operation across multiple processes is an all-or-nothing proposition. In contrast, asynchronous messaging allows each communication operation between two processes to be a self-contained, standalone unit of work. The process initiating the original request need only be concerned with initiating the "request", knowing that it will eventually receive a "response" asynchronously.</p> <p>Such asynchronous behavior is particularly relevant when using Web Services to abstract and control Telco resources.</p> <p><i>Macro-Objective:</i></p> <p>The macro objective of the work proposed is to analyse different solutions/emerging standards for asynchronous Web Services and to implement a prototype Web Service (based on a chosen standard) that allows the asynchronous control of a Telco resource.</p>
Durada	The assignment will take between eight to nine months
Requisits	<p>Main Skills:</p> <ul style="list-style-type: none"> - Distributed Applications - Java - Web Services - Telco Control - Fluent English
Nombre de places	1

Codi	I TILAB Tor-2
Data d'entrada	Primavera 2008
Tipus d'estada	PFC
Descripció	<p>Application-aware control plane in ASON/GMPLS networks</p> <p>After a preliminary study about the requirements of an application-aware control plane, master thesis should focus on designing a possible architecture. The implementation of the designed architecture might be integrated in a proprietary ASON test bed.</p>
Durada	The assignment will take nine months, beginning on April/May 2005
Requisits	<ul style="list-style-type: none"> - Excellent knowledge of transport network technologies (SDH, WDM) - Excellent knowledge of TCP/IP protocols - Excellent knowledge of C programming Language - Knowledge of socket programming
Nombre de places	1