

SIMPOSIO de DOCTORADO en la UPM 2019:

“CUENTANOS TU TESIS”

MY THESIS IN A NUTSHELL

PROGRAMA del SIMPOSIO (7-10 de Mayo de 2019)

ETSI Agronómica, Alimentaria y de Biosistemas. Salón de actos del edificio Agrícolas.

MARTES 7 de Mayo

9:00 -9:45 h: INAUGURACIÓN del SIMPOSIO.

Ponencia: **“Atracción y Retención de Talento”**

Dña. **Asunción Gómez Pérez**. Vicerrectora de Investigación, Innovación y Doctorado.

**9:30 - 11:00 h. Exposiciones del Área Doctoral TECNOLOGÍAS
AGROFORESTALES Y MEDIOAMBIENTALES.**

Ana Artalejo López. ETSI MINAS Y ENERGÍA

Doctorado en Investigación, Modelización y Análisis del Riesgo en Medio Ambiente.

Director de tesis: Jesús Díaz Curiel

Título: ***Investigación sobre parámetros y técnicas de prospección eléctrica por corriente variable para la detección directa de contaminantes hidrocarburoados en suelos y acuíferos superficiales.***

“Soil pollution is a widespread problem that has traditionally been investigated using intrusive techniques. These techniques provide information in a dotted grid and can open new routes through which the pollutant can move. In this thesis the combined applicability of several geophysical prospecting techniques is evaluated since they are surface methods that do not disturb the subsoil and provide spatial (2D and 3D) information of the problem. The techniques analyzed are resistivity and induced polarization tomography and time domain electromagnetic surveys.”

Bruno Cuevas Zuviría. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Biotecnología y Recursos Genéticos de Plantas y Microorganismos Asociados.

Director de Tesis: Luis Fernández Pacios

Título ***Modelos pequeños de la densidad electrónica para moléculas grandes***

“Molecular attributes are dependent on the behaviour of electrons, which are controlled by the complex laws of quantum mechanics. Therefore, it is very costly to simulate properties of molecules. In my thesis, I am developing an empiric model of electron density that is based in a very small number of mathematical functions so it can be applied to large molecules as proteins.”

Javier Delso Martínez. ETSI MONTES, FORESTAL Y DEL MEDIO NATURAL

Doctorado en Investigación Forestal Avanzada

Directores de Tesis: Belén Martín Ramos y Emilio Ortega Pérez

Título: ***Estudio de la fragmentación urbana y la movilidad peatonal mediante indicadores de fragmentación ecológica basados en SIG.***

"Walking is accessible to most of the population regardless of their income level, it is neither expensive, nor emits greenhouse gases and at the same time it provides important health benefits to the walking subject. However, walking behaviors have been influenced by high levels of motorized mobility which have generated urban fragmentation patterns that hinder non-motorized transportation. My research is oriented towards the study of spatial networks and environmental (GIS) methodologies and their applicability to study the effects that urban fragmentation could have on pedestrian accessibility. Over the last three years I have been developing several methodologies to measure the effects that barriers over the city could have on pedestrian behaviors and movements. Among the future perspectives of my research is the application of circuit networks, such as the ones applied in the last decade to investigate habitat connectivity, to study urban networks connectivity."

Khosro Fazelpoor. ETSI MONTES, FORESTAL Y DEL MEDIO NATURAL

Doctorado en Ecología. Conservación y Restauración de Ecosistemas

Director de tesis: Diego García de Jalón

Título: ***Assessment of riparian vegetation changes below large dams.***

"River regulation by dams modulated flow regimes, interrupts the transfer of sediment through channel form and processes. In this research, we will analyze the River Tajo geomorphic status combining field data measures with available hydrological data. In addition, we study the riparian vegetation link to river hydromorphic dynamic, as riparian vegetation is the interface between terrestrial and freshwater ecosystem, having the potential to protect water bodies from land-based pollution, and also enhancing the delivery of a range of ecosystem service. Furthermore, along different years of analysis, we will attempt to compare riparian vegetation delineation methods and we will investigate how changes in ecological processes mutate to the river and their riparian vegetation."

Guillermo Fondevila Lobera. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Tecnología Agroambiental para una Agricultura Sostenible

Director de tesis: Gonzalo González Mateos

Título: ***Efecto de la restricción alimenticia sobre el comportamiento, el crecimiento y el desarrollo de tracto gastrointestinal en pollos de engorde.***

"La industria de producción avícola se está volcando en la búsqueda de nuevas prácticas que permitan mejorar el bienestar de los animales sin afectar a los costes de producción. En pollos de engorde, la alimentación intensiva se asocia frecuentemente con una serie de problemas metabólicos que pueden aumentar la tasa de mortalidad. Tiempos de ayuno moderados, como los derivados de la aplicación de la normativa europea (Council Directive 2007/43/EC) ayudan a reducir el sobreconsumo y los problemas asociados a este, a la vez que alteran las pautas y mecanismos de alimentación de las aves. El efecto de la restricción alimenticia sobre el consumo de pienso, el crecimiento y el desarrollo del tracto gastrointestinal de los pollos de engorde a edades tempranas depende de su duración y de la velocidad de adaptación de las aves a las condiciones de ayuno aplicadas."

Sharareh Ghasemi. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Biotecnología y Recursos Genéticos de Plantas y Microorganismos Asociados

Director de tesis: Jesús Vicente Garbajosa

Título: ***Mannipulation of Endoplasmic-Reticulum Stress components in plants to improve crop performance.***

"A- Identification of novel components of the ER-stress response in plants

1. Screening the Transplanta collection (TPT) to identify TFs whose expression leads to ER-stress tolerance (paper in Frontiers); 2. Search for interacting partners of known components (bZIP60, IRE, bZIP47 and 28) as novel regulators of ER-stress responses.

B- Analysis of gain and loss of function mutants of the identified components in response to different stress responses: - abiotic stress (osmotic, drought, extreme temperatures, etc.), nutrient limitation: nitrogen, sulfur, carbon (extended night), biotic stress (pathogen infection)

Applications: By manipulating the [removed]quantity and tissue pattern) of the identified components it is expected to obtain plants with enhanced performance to nutrient limitation (growth on marginal lands or reduced fertilization), biotic and abiotic stress tolerance."

Ana Guillem Amat. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Biotecnología y Recursos Genéticos de Plantas y Microorganismos Asociados

Director de tesis: Félix Ortego

Título: ***Genetics and mechanisms of insecticide resistance in Ceratitis capitata and its implication for resistance management.***

"The sustainability of control programs for the Mediterranean fruit fly, *Ceratit* capitata, is threatened by the development of resistance. We have shown that Spanish field populations are resistant to lambda-cyhalothrin and deltamethrin, and though they still remain highly susceptible to spinosad, resistance alleles are present at low frequency. Resistance to lambda-cyhalothrin, which confers cross-resistance to deltamethrin, was shown to be incomplete, dominant and polygenic probably involving several P450s; and we are searching for a molecular marker to facilitate field monitoring. Spinosad resistance alleles, encoding truncated $\alpha 6$ subunits of the nicotinic acetylcholine receptor, were characterized as recessive, conferring complete resistance and associated with high fitness costs. Modelling of resistance evolution and simulations of insecticide treatment scenarios using a multiresistant strain indicate that for an effective implementation of resistance management strategies: i) lambda-cyhalothrin and deltamethrin should not be used together; and ii) spinosad can be rotated with lambda-cyhalothrin or deltamethrin."

Guadalupe Hernández Ramírez. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Biotecnología y Recursos Genéticos de Plantas y Microorganismos Asociados

Director de Tesis: Araceli Díaz Perales.

Título: ***The impact of grass mold infestation on asthma attacks in autumn***

"Mold airborne and grass pollen are important aeroallergen sources with different seasonal behavior: whereas pollen levels have a marked seasonality (high levels in late spring and early summer), fungal spores are an ever component of the environment, reaching higher levels in late summer and early autumn. In Central Spain, clinical evidences about patients with grass pollen allergy who suffer from asthma attacks in September-October have been reported, when pollen is not longer present. In the current study, several assays have been performed in order to prove a possible cosensitization phenomenon between grasses and associated-fungi. After having identified five fungal isolates from grasses which have long been associated with allergy, immunodetection assays have revealed that up to 60% of grass pollen sensitized-patients have sIgE against fungal proteins, and around 40% of them react to fungi by skin prick test. Although a pull down assay is necessary to confirm an interaction between both allergen sources, these results support the hypothesis that a cosensitization process could be occurring in autumn when there are high levels of spores and asthma symptoms have been reported in this patient profile."

Anne Krus. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Agroingeniería

Director de tesis: Constantino Valero

Título: ***Phenotypic characterization of crops for automation of agricultural tasks***

"The SureVeg project focuses on Strip-cropping and waste recycling for biodiverse and resource-efficient intensive vegetable production (where the capitalisation together forms the project title). In this project we are participating in and leaders of work package 4, titled "Smart machinery for SC systems," with the objective "to develop agronomic technology suited for SC systems to overcome barriers from currently available standard technology." More specifically a modular multi-purpose robotic tool is proposed, including built-in sensors and cameras. In my 3 minute pitch I will briefly introduce the proposed SC farming method, the suspected benefits, and the execution of the first trials in the Netherlands. Using two lidars a joint point cloud was reconstructed, accurately portraying each strip. The standard mounting makes this a fairly easy and quick method to keep track of crop development with millimetre accuracy!"

André de Jesús Moda. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Agroingeniería

Director de Tesis David Pereira Jerez

Título: ***Sedentarización y autonomía de las unidades agrícolas familiares.***

“Estrategia para aumentar la Resiliencia en el Desarrollo Sostenible en el Medio Rural en el Sur y Sudoeste Angolano”. They stand out because they present rapid growth, high regeneration capacity, drought resistance and the ability to propagate sexually and asexually. The species have been exploited as fodder, for high nutritional value, as producers of live cuttings and, as an alternative energy source. Several artificial stands were implanted, mainly in the State of Sergipe, today with great acceptance by the small rural producers, coming to overcome the interest in *Leucaena leucocephala* already established in the region since the 1970s. In the other states of the Northeast region, due to its potential, this species has aroused great interest in its cultivation.”

Ana Moreno de la Fuente. ETSI AGRONÓMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Tecnología Agroambiental para una Agricultura Sostenible

Director de Tesis: Pilar Medina Vélez y Elisa Viñuela Sandoval

Título: ***Nuevas perspectivas de control biológico en un escenario de cambio global.***

“El objetivo general de la tesis doctoral es estudiar los efectos de estreses abióticos provocados por el cambio climático sobre el control biológico de insectos plaga en cultivos agrícolas. Para ello, y mediante ensayos controlados en laboratorio, se está evaluando el efecto del incremento del dióxido de carbono atmosférico y de la temperatura global en las interacciones entre plantas, insectos plaga vectores de virus que causan enfermedades en planta, y sus enemigos naturales. Estos últimos son insectos depredadores y parasitoides que se alimentan de insectos herbívoros y son empleados en los programas de control biológico, dentro de la Gestión Integrada de Plagas, para ayudar a controlar las plagas de los cultivos.”

Farnoosh Naderi. ETSI MONTES, FORESTAL Y DEL MEDIO NATURAL

Doctorado en Ecología. Conservación y Restauración de Ecosistemas

Director de tesis: Alicia Palacios Orueta

Título: ***Rangeland monitoring based on remote sensing time series.***

“Monitoring is essential for appropriate rangeland management. In rangeland condition assessment and monitoring within and across vegetation types in whole of Iran. Understanding and analyzing the dynamics of natural areas, as one of the most valuable ecological resources, is of great importance for effective management of these environments. By definition, rangeland monitoring is the gathering of basic ecological information that describes rangeland attributes using systematic and repeatable methods. An understanding of rangeland attributes can be used to better understand range condition or the current state of rangeland health and trend. Remote sensing provides an effective tool for rapidly and accurately assessing rangeland vegetation. Managers benefit from improved monitoring methods that provide rapid, accurate, cost-effective, and robust measures of rangeland health and ecological trend. In this study we want to focus on rangelands dynamics of to understand past and actual state and trends. Iran is located in the drought belt in west part of Asia, and is highly susceptible to climate change. In this work the responses of vegetation to water availability will be evaluated, and the effect of landform and lithology will be assessed. Remote sensing time series will be used to assess vegetation dynamics and responses to water availability. Based on this information vulnerability maps will be compiled”

Paolo Triozzi. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Biotecnología y Recursos Genéticos de Plantas y Microorganismos

Asociados

Director de Tesis: Isabel Allona y Mariano Perales

Título: ***RAV1-RbohD1 transcriptional module increases stomatal responsiveness contributing to poplar autumnal acclimation.***

“Cycles of growth-dormancy are essential for the survival of woody perennials to cope with low temperature in boreal and temperate regions during autumnal-winter seasons. Regulation of stomatal movement is critical for water use efficiency, photosynthesis and plant thermoregulation. However, the link between poplar autumnal acclimation and stomatal regulation has not yet been identified. We found that autumnal cues, short days and low ambient temperature induced a transcriptional module composed of the poplar transcription factor RAV1 and its target gene RbohD1, a NADPH oxidase implicated in reactive oxygen species (ROS) signaling. We propose that transcriptional induction of RAV1-RbohD1 module improves stomatal responsiveness regulating diurnal stomatal activity, which participates in poplar acclimation under the autumn environment.”

Eduardo Vázquez García. ETSI AGRONÓMICA ALIMENTARIA Y DE BIOSISTEMAS
Doctorado en Tecnología Agroambiental para una Agricultura Sostenible

Director de tesis: Marta Benito

Título: ***Impact of liming and no-tillage on nitrogen transformation rates under Mediterranean climate.***

“Soil degradation and decreasing soil fertility, some of the main agricultural concerns, are aggravating due to excessive soil tillage and soil acidification. Liming to raise soil pH and the reduction of soil disturbance by tillage have been proposed to restore soil quality. However, the impact of such agricultural practices on the nitrogen (N) cycling and potential N losses remains unclear, particularly during the summer fallow in the Mediterranean climate. Extreme conditions in terms of drought and heat do not sustain plant growth and thus, lead to accumulation of microbial by-products and inorganic N, which may have strong implications for greenhouse gas emissions and nitrate leaching after summer or autumn rains. The aim of this thesis was the identification of underlying mechanisms of potential N losses during summer fallow period under rainfed Mediterranean agriculture in order to enhance N use efficiency and contribute to sustainable agriculture.”

11:00 - 11:30 h. PAUSA CAFÉ

11:30 - 12:30 h. Exposiciones del Área Doctoral de INGENIERÍA CIVIL:

Antonio Alonso Jiménez. ETSI MINAS Y ENERGÍA

Doctorado en Investigación, Modelización y Análisis del Riesgo en Medio Ambiente

Director de tesis Agustín García-Berrocal Sánchez

Título: ***Metodología para determinar el estado tensional inicial del macizo rocas antes de su excavación de grandes cavidades subterráneas en rocas ornamentales***

“Develop a methodology to determine the initial tensional state of the rock mass before the excavation of large underground caverns. Focused to allow the later design of the camera and the optimization of its size, methods of exploitation and support.”

Guillermo Alfredo Flores Cuevas ETSI CAMINOS, CANALES Y PUERTOS

Doctorado en Sistemas de Ingeniería Civil

Director de Tesis: Juan Gallego Medina

Título: ***Optimization of cold recycled mixtures with emulsion and high RAP content.***

“Over time, deteriorated road surfaces require actions to maintain the pavement in good condition. The traditional maintenance projects based on hot asphalt mixes generate considerable pollution and consume scarce resources such as natural aggregates. In addition, the transport of material and waste increases costs and causes environmental damage. One of the alternatives with less environmental impact is in situ recycling with emulsion. The present work analyzes in laboratory the recycling of pavement without the need of new aggregates. The objective of the research is to study the factors that affect the properties of cold bituminous mixtures with emulsion and 100% RAP and to advance in the design methodology, seeking the highest possible performance.”

Roberto García Sainz. ETSI CAMINOS, CANALES Y PUERTOS

Doctorado en Ingeniería de las Estructuras, Cimentaciones y Materiales

Director de tesis: Alejandro Pérez Caldentey

Título: ***Estudio de la fisuración en vigas de hormigón armado a tracción y flexión.***

“Influence of type of loading (tension or bending) on cracking behaviour of reinforced concrete elements. theoretical and experimental study

Carlos Gordo Monsó. ETSI CAMINOS, CANALES Y PUERTOS

Doctorado en Ingeniería de las Estructuras, Cimentaciones y Materiales.

Director de tesis: Claudio Olalla Marañón

Título: ***Diseño sismorresistente de estaciones de Metro.***

"El comportamiento de las estructuras subterráneas bajo la acción del sismo difiere notablemente del correspondiente a estructuras en superficie. Mientras que en las estructuras en superficie los efectos inerciales de la masa son los que esencialmente controlan el comportamiento de la misma, en una estructura enterrada son los efectos cinemáticos de compatibilidad de deformaciones entre la estructura y el suelo circundante los que determinan el comportamiento de esta. En esta tesis se propone un nuevo marco metodológico para analizar el comportamiento de las estructuras subterráneas rectangulares en términos de las deformaciones y esfuerzos que se desarrollan durante un evento sísmico. La idoneidad de los métodos propuestos se ha verificado tanto mediante modelos numéricos avanzados como comparándola con los resultados empíricos obtenidos por otros autores en ensayos en centrifugadoras. Los métodos se han propuesto en un formato sencillo que permita su eventual inclusión en normativas de construcción sismorresistente."

José Manuel Lizarraga López. ETSI CAMINOS, CANALES Y PUERTOS

Doctorado en Sistemas de Ingeniería Civil

Director de tesis: Juan Gallego Medina

Título: ***Análisis de la capacidad auto-reparadora de Mezclas Templadas Recicladas con Escoria y Árido Reciclado para la conservación de firmes de carreteras***

"Asphalt mixtures requiring lower manufacturing temperatures combined with sustainable industrial by-products (e.g. steel slag and recycled asphalt) are gaining worldwide boost because of the provision of environmental stewardship, economic savings, and significant reduction in the consumption of natural resources and greenhouse gas (GHG) emissions compared with other existing paving technologies. In this sense, this research paper aims to present and quantify the recovery capability of the self-healing ratio (HR) of half-warm mix recycled asphalt mixtures containing three different electric arc-furnace steel (EAFS) slag aggregate contents (0%, 4%, and 8%), and reclaimed asphalt pavement (RAP) obtained from aged pavements. To do so, the research methodology was broken down into two main phases: (1) A thermographic imaging analysis (e.g. microwave heating temperature vs energy consumed); (2) and (4) the recovery capability of the mixtures' healing ratio (HR). This research study revealed that the 8% EAFS mixture turned out to be the most energy-efficient solution by reaching the target microwave heating temperature of 80 °C, at 120 s, and that the use of a microwave healing treatment was capable of recovering the macrocracks of the actual asphalt mixtures in road pavements. These findings encourage greater confidence in promoting the use of these types of sustainable asphalt mixes for road pavements or urban areas."

Marco López Gómez. ETSI EDIFICACIÓN

Doctorado en Innovación Tecnológica en Edificación

Director de Tesis: Alfonso Cobo Escamilla

Título: ***A new way to build.***

"It is projected that in the year 2030, over 3000 million people will not have access to a house. But what if there existed a highly standardized technology that could enable everybody to be a licensed builder of their own house by using using only a few tools and their hands?"

Jaime SantaMarta Martinez. ETSI EDIFICACIÓN

Doctorado en Innovación Tecnológica en Edificación

Director de Tesis: Jaime Santa Cruz Astorqui.

Título : ***Optimización de los procesos bim en el mantenimiento operacional de estructuras singulares.***

"BIM 7D dimension fundamental is based on integrating the asset management processes of an infrastructure within the use of a BIM model. This means that, through a three-dimensional visualization interface and using an electronic document management system (EDMS) as support, all the as-built documentation, as well as the related to maintenance and operation of the infrastructure will be integrated."

Romi Satria. ETSI CAMINOS, CANALES Y PUERTOS.

Doctorado en Sistemas de Ingeniería Civil.

Director de Tesis: Maria Castro Malpica

Título: *Spatial Analysis of Road Design and Traffic Accident Based on GIS. The Case of Banda Aceh, Indonesia*

"Improving traffic safety is a priority of most transportation agencies around the world. As part of traffic safety management strategies, efforts have focused on developing more accurate crash-frequency models and on identifying contributing factors in order to implement better countermeasures to improve traffic safety. Over time, models have increased in complexity and computational time. Bayesian models using the MCMC method have been commonly used in traffic safety analyses because of their ability to deal with complex models. Recently, the INLA approach has appeared as an alternative to the MCMC method by significantly reducing the computing time. In this study, an INLA-CAR model is developed to assess crashes by severity at the segment level on a highway section in Banda Aceh, Indonesia; and is compared with a Bayesian non-spatial model. Results of the DIC shows the importance of including spatial correlation in the models. The models' coefficient estimates show that AADT is the most influential in both models and across all severity types; however, the coefficient estimates for land use and horizontal alignment vary across severity types. Finally, in order to assess some limitations of the DIC, three other goodness-of-fit measures are used to cross-validate the results of the DIC."

12:30 - 13:30 h. Exposiciones del Área Doctoral TECNOLOGÍAS INDUSTRIALES:

Marina Adel Shokry Nada Faragalla. ETSI INDUSTRIALES

Doctorado en Ingeniería Eléctrica y Electrónica

Director de tesis: Julio Martinez Malo

Título: *Smart diagnosis for cable sheath condition in high voltage cable systems*

"The thesis is devoted to develop a general criterion for detecting defects in HV cable sheaths by monitoring the cable sheath currents. Taking into consideration the difference influence factors that might affect the developed criterion:

- 1- Grounding cable configuration (single point (SP), solid bonding (SB), Cross bonding (CB) with and without transposition)
- 2- Load current
- 3- Longitude of the cable and unbalance percentage in the longitude of the minor section in case of CB
- 4- Formation type (trefoil or flat)"

Miguel Ángel Calero Gallardo. ETSI AERONÁUTICA Y DEL ESPACIO

Doctorado en Ingeniería Aeroespacial

Director de Tesis: Antonio Fernández López & Adolfo Güemes Gordo

Título: *Uso de Metodologías de "propagación de daño" en Estructuras Aeronáuticas en CFC.*

"Las primeras estructuras aeronáuticas diseñadas y construidas en materiales compuestos se certificaron hace alrededor de 30 años. Las bases de certificación y medios de cumplimiento que se usaron entonces, con ligeras variantes, siguen siendo los mismos que en la actualidad. Esto es completamente aplicable en todos los aspectos relacionados con la fatiga y tolerancia al daño en dichas estructuras. Existen otros campos de la ingeniería donde ya se está teniendo en cuenta la fatiga y la tolerancia al daño para estructuras avanzadas en material compuesto, siendo aceptado por las correspondientes autoridades de certificación. En el campo aeronáutico se va aun retrasado en este aspecto. En la ponencia se trata de mostrar posibles formas de aplicar metodologías de tolerancia al daño para dichas estructuras."

Javier Díaz Roza. ETSI INFORMÁTICOS

Doctorado en Inteligencia Artificial

Director de tesis: Pedro Larrañaga y Concha Bielza

Título: *Clustering of Data Streams with Dynamic Gaussian Mixture Models. An IoT Application in Industrial Processes*

"In Industrial Internet of Things applications with sensors sending dynamic process data at high speed, producing actionable insights at the right time is challenging. A key problem concerns processing a large amount of data, while the underlying dynamic phenomena related to the machine is possibly evolving over time due to factors such as degradation. This makes any actionable model become obsolete and

necessary to be updated. To cope with this problem, in this paper we propose a new unsupervised learning algorithm based on Gaussian mixture models called Gaussian-based Dynamic Probabilistic Clustering (GDPC) mainly based on three components: the EM algorithm to estimate the model parameters and the Page-Hinkley test and Chernoff bound to detect concept drifts. Unlike other unsupervised methods, the model induced by the GDPC provides the membership probabilities of each instance to each cluster. This allows to determine, through a Brier score analysis, the robustness of the instance assignment and its evolution each time a concept drift is detected. Also, the algorithm works with very little data and significantly less computing power being able to decide whether (and when) to change the model. The algorithm is tested using simulated and also real data streams from an industrial testbed where different operational states are automatically identified, giving good results in terms of classification accuracy, sensitivity and specificity."

Ana Nieto. ETSI AERONÁUTICA Y DEL ESPACIO

Doctorado en Ingeniería Aeroespacial

Director de Tesis: Gustavo Alonso, Javier Cubas

Título: ***Analysis of the trends in air traffic and CO₂ emissions within the European Union.***

"The purpose of this study, is to analyse the evolution of the air traffic in the European Union and its emissions, trying to evaluate the impact of the new technologies, regulations and business strategies of the airlines and to compare them between regions and between types of flights. The methodology is based on the analysis of the EUROCONTROL flight database, which includes all the flights from and to its territory plus Iceland and Azerbaijan, and the Eurostat statistics. Preliminary results show the constant growth of the number of flights and emissions in all countries before the crisis of 2008, the speed of the following recovery, the relevance of low-cost air carriers in the intra-EU market and the concentration of traffic in the five biggest countries (UK, France, Germany, Italy and Spain)."

Manuel Pena Rodríguez. ETSI AERONÁUTICA Y DEL ESPACIO.

Doctorado en Ingeniería Aeroespacial

Director de Tesis: María Luisa Rapún Banzo

Título: ***Damage detection in thin plates via infrared thermography.***

"Non-destructive testing is a hot topic in the aerospace industry due to the need of faster, cheaper and more accurate techniques. In this thesis we study the possibility of inferring the number, position, and shape of the defects of a metal plate by processing infrared thermograms of one of the surfaces of the plate obtained after heating it with a lamp. A thermogram is an image where each pixel is colored according to its temperature. Recording information from the surface of the plate via active thermography is much faster, more non-intrusive and non-contact than in ultrasound inspection. However, the signal-to-noise ratio is less favorable and, in some situations, one is not able to detect the defects by direct inspection of the raw thermograms. We propose to process those thermograms by a very powerful and computationally inexpensive mathematical tool called topological derivative. Numerical results will be presented to illustrate its performance."

Rocio Rodríguez Rivero. ETSI INDUSTRIALES

Doctorado en Ingeniería de Organización

Director de tesis: Isabel Ortiz Marcos

Título: ***The Logical Framework with a Risk Management Approach***

"International Development (ID) although it has improved in its strategies and management methods, continues to show deficiencies which sometimes lead to their failure or partial achievement of their objectives. The success of an ID project depends on many factors, some of them unpredictable since uncertainty is always present in human actions and, therefore, risks are inevitable. However, identifying them as soon as possible and thinking about their responses could help to minimize the negative aspects and maximize the positive ones. Risk Management (RM) is the area of knowledge of Project Management (PM) that helps in this process and has been chosen by 77 professionals of ID projects to improve the Logical Framework (LF), the most popular methodology to manage ID projects. The logical framework with a risk management approach has been designed to help to increase the efficiency levels of ID projects."

Carlos Alberto Talayero Giménez de Azcárate. ETSI INDUSTRIALES

Doctorado en Ingeniería Mecánica

Director de Tesis: Gregorio Romero Rey

Título: ***Modeling of Blood Clot Removal with Aspiration Thrombectomy devices.***

“Aspiration thrombectomy is one of the most effective systems for blood clot removal and vessel recanalization. Different computer tools have been used for modelling: Bond-Graph methodology, Multi-Body Simulation (MBS), Finite Element Method (FEM) and Computer Fluid Dynamics (CFD). Co-simulation between the fluid domain (Bond Graph or CFD) and the mechanical domain (FEM or MBS) is needed. The modelling for the mechanical domain focuses on the clot and the distal end section of an aspiration device. The final model considers an elastic characterization of the blood clot with progressive detachment from the vessel wall. The results of such modelling could potentially improve the effectiveness of blood clot removal by potentially reducing the risk of clot fragmentation.”

Mohammad Mahdi Zarei. ETSI INDUSTRIALES

Doctorado en Ingeniería de Organización

Director de Tesis José Julián Chaparro Peláez

Título: ***Barriers & drivers in Omni last-mile logistics.***

“This exploratory study investigates consumer’s last-mile logistics selection behaviour using the theory of planned behaviour (TPB) in Omni channel environment. According to TPB model, the study uses relevant attitudinal beliefs (e.g., flexibility, saving effort, saving time, transportation cost, and risk factors), normative beliefs (e.g., family and friends), and perceived behavioural control beliefs (e.g., self-efficacy and facilitating conditions). For developing an in-depth research, the study takes three situational factors into account: “time availability”, “spill-over effect”, “geographical distance”. Consistent with the framework, this study employs an e-mail survey and obtains 445 usable surveys. To analysis this data, the research carries out factor analysis and regression. The final results show three contributions. First, it shows which factors are the key factors in consumer’s logistics options preference. Second, it shows the relative importance of these three situational factors on the last-mile logistics. Third, it demonstrates the moderating impact of these situational factors on the key factors. As a conclusion, by extracting this information, not only strongly helps retailers deploying their last-mile logistics to have the best configuration, but also contributes to explore last-mile logistics in an environment which goes beyond the singularity of online and offline shopping.”

MÉRCOLES 8 de Mayo

9:30 - 11:00 h. Exposiciones del Área Doctoral ARQUITECTURA.

Miguel-Ángel Álvarez-Pérez. ETS ARQUITECTURA

Doctorado en Construcción y Tecnología Arquitectónicas

Director de Tesis: Manuel Soler Severino y Eugenio Pellicer Armiñana

Título: ***La implantación del sistema del diseño de valor objetivo y los métodos colaborativos (TVD e IPD) en el proceso constructivo en España.***

Julia Ayuso Sánchez. ETS ARQUITECTURA.

Doctorado en Construcción y Tecnología Arquitectónicas

Director de Tesis Sergio Vega Sánchez

Título ***Cuantificar el "je ne sais quoi" de la Arquitectura***

"Numerous studies endorsed by the scientific community state that workplace design can contribute to an improvement in the productivity and well-being of the users. However, it is necessary to go a step further and objectify the criteria that increase productivity and well-being in the practice of architectural design. The main contribution of this Thesis is the development of a tool that responds to the challenges of how to measure the increase in productivity and well-being through architectural design. The proposed tool allows us to measure the characteristics that can improve productivity and well-being, based on a scientific method, and through a holistic approach of the physiological, psychological, emotional and cultural factors that impact on productivity and well-being of the users. The tool is ascertained through the implementation of three pilot experiments. To verify a tool that quantifies the impact of design features on the increase of productivity and well-being, three previously programmed pilot experiments were carried out, such as a small-scale version conducted in preparation for a major study. These Scenarios studies evaluated the impact of tangible and intangible variables on the workplace, thus allowing for the in-depth analysis of workplace design knowledge. Simultaneously, the role of biophilic design in indoor environments - defined as spaces within buildings featuring natural elements - has received relatively little attention, compared to the number of studies evaluating the impact of other indoor environment characteristics of the buildings related with electrical and mechanical systems, thermal factors, noise and vibrations, ergonomics and office fit-outs. The present study is one of the first studies to evaluate and measure the combination of variables concerning biophilic design proposals. The results highlight an improvement in well-being, productivity, creativity and health by introducing biophilic characteristics into workplace design. The tool developed and tested in these pilot experiments opens up a path to increase productivity in the workplace in contrast to existing practices."

Laura Cambra Rufino. ETS ARQUITECTURA

Doctorado en Construcción y Tecnología Arquitectónicas

Director de Tesis: José León Paniagua Caparrós y César Bedoya Frutos

Título: ***Spanish hospital design: analysis and evaluation***

"Despite the economic recession, the Spanish healthcare system has proven to be resilient but further efforts should be made to ensure its sustainability and affordability. Given that there is scientific evidence that links healthcare outcomes with design, one way of improving the efficiency of healthcare delivery is by improving the built environment where it takes place. This thesis focuses on the design of a tool that evaluates the functional and environmental quality of Spanish hospitals in use. The aim of this tool is to analyse existing facilities and to identify improvement measures based on Spanish and international guidelines, best practice, intuition and research."

Juana Canet Rosselló .ETS ARQUITECTURA

Doctorado en Arquitectura y Urbanismo

Director de Tesis: Ginés Ignacio Garrido Colmenero

Título: *Campos de refugiados: ciudades efímeras. Atlas del Mediterráneo y de África Subsahariana*

"Two documents form part of the PhD ThesisOne, entitled: An Atlas of Refugee Camps. The Mediterranean and Subsaharian Africa. which analyses 245 camps in 32 different countries which average duration is 20 years. Of these 245 camps, 12 case studies are analyzed in greater detail (on process). Another one, entitled: Camps: Ephemeral cities. Planning design and camp assessment toolkits which analyses different conceptual topics about the refugee condition, the border, the migration movements, the camps, the city versus the camp and different planning and assessment toolkits. Finally, a new toolkit is proposed and is applied as a test to the 12 case studies."

Elena Cuerda. ETS ARQUITECTURA.

Doctorado en Construcción y Tecnología Arquitectónicas

Director de Tesis: Francisco Javier Neila González

Título: *¿Cuáles son los parámetros que tienen mayor influencia en la eficiencia energética de los edificios?*

"Today, one of the key objectives pursued by the European policymakers is improving energy efficiency in buildings, as the energy consumption of buildings in the EU accounts for about 40% of total final energy use [1]. In order to achieve these objectives, is essential to have calculation methods to determine the energy performance of buildings. Dynamic thermal simulation programs are the tools used for this purpose. In fact, in many countries including Spain, these programs are used as a verification method of compliance with the regulations. However, numerous studies [2-5] have shown that the actual thermal performance of buildings does not correspond to the calculated behaviour. Thus, the highly predictive potential of these tools is reduced. The hypothesis is that in-situ measurements and energy monitoring procedures in real use conditions in buildings can be used to calibrate energy simulation models in order to assess the real hygrothermal behaviour in buildings. The overall objective is therefore to assess the main reasons for the difference between theoretical and actual energy performance of various collective housing buildings combining experimental data and computer simulations. In order to test the hypothesis and fulfill this objective, experimental studies will be carried out in various collective housing buildings in a neighbourhood of the city of Madrid, in which in situ and energy performance monitoring measurements are performed. The data collected will be used to calibrate energy simulation models in order to characterize the actual energy performance of buildings. Due to the location of the case studies, the conclusions are partly associated with the climatic zone that corresponds to the city of Madrid.

Andrea Gamio. ETSI EDIFICACIÓN.

Doctorado en Innovación Tecnológica en Edificación

Director de Tesis: María de las Nieves González

Título *Diseño de módulo de refugio vernacular para la población vulnerable del altiplano peruano.*

"This work is aimed to acknowledged an ancestral construction system, known as "Putuco", this system is originated in the pre-inca period. This system is known to last over time, and used by the inhabitants of this areas, the use of this ancestral technique of construction was spread on the highlands of Peru and Bolivia . The use of Putucos made the houses resistance to harsh climates and constant changes of it. Nowadays the old and new vestiges are still used by the Andean communities. The Putucos are built based on the construction units called ""Ch'ampas or T'epe"" , terminology in the area of influence (ch'ampas in Perú, t'epe in Bolivia) . The method of analysis used consisted, of visual inspection and sampling of the material (ch'ampas), then select samples that meted optimum conditions and sent to the laboratory t for physical and mechanical tests. The samples to be tested had a variety of dimensions. "

María Jesús Sacristán de Miguel. ETS ARQUITECTURA

Doctorado en Construcción y Tecnología Arquitectónicas

Director de Tesis: Javier Neila y Estefanía Caamaño

Título: *Evaluación para conseguir barrios de energía positiva*

"Buildings Zero Energy drive to Neighbourhood zero energy. A methodology to assess existing built environment is a way to improve sustainability in cities."

11:00 - 11:30 h. PAUSA CAFÉ

11:30 - 12:30 h. Exposiciones del Área Doctoral de TECNOLOGÍAS DE LA INFORMACIÓN Y LAS COMUNICACIONES

David Atienza González. ETSI INFORMÁTICOS

Doctorado en Inteligencia Artificial

Título: ***Learning Bayesian Networks from Continuous Data***

Machine learning is a branch of artificial intelligence that has gained importance in recent years, thanks to the increased generation of data by millions of devices and sensors around the world. In the context of industry and manufacturing, its implementation will be a major contributor for a change in the industry that has been called Industry 4.0. However, there are two main issues to apply machine learning in the industrial setting: the models generated should be interpretable (to avoid unexpected behavior and obtain new knowledge about production processes) and able to process continuous data. This thesis proposes the use of Bayesian networks, given their great interpretability. However, most state-of-the-art works make important assumptions about the probability distribution of continuous data. In this thesis, it will be addressed the learning of Bayesian networks with good performance without making restrictive assumptions about the probability distribution of the data.

Samira Briongos Herrero. ETSI TELECOMUNICACIÓN

Doctorado en Ingeniería de Sistemas Electrónicos

Director de tesis: José Manuel Moya Fernández

Título ***Analysis and design of microarchitectural side-channel attacks and countermeasures.***

“The software is traditionally designed under the assumption that the hardware is correct and consequently secure. As it has been demonstrated, this assumption is completely wrong and the microarchitecture can undermine the security of a system. Microarchitectural attacks can extract secret keys from even the most theoretically secure cryptographic algorithms such as AES or RSA, or extract data from the memory of the system. In this work, we show how these attacks work and we demonstrate their power extracting private information from a victim in less than 100 ms. However, there is no need to panic, we have also observed that these attacks introduce parasitic effects in their victims that reveal them. To sum up, it is not possible to defeat such attacks without a deep knowledge of the microarchitecture and the principles under which they work and this is what we do in this thesis”.

Alba Fernández Izquierdo. ETSI INFORMÁTICOS

Doctorado en Inteligencia Artificial

Director de tesis: Raúl García Castro

Título: ***Evaluación de ontologías basada en patrones lexico-sintácticos.***

“In the software engineering field, every software product is delivered with its pertinent associated tests which verify its correct behaviour. Besides, there are several approaches which, integrated in the software development process, deal with software testing, such as unit testing or behaviour-driven development. However, in the ontology engineering field there is a lack of clearly defined testing processes that can be integrated into the ontology development process. In this thesis we propose a testing framework composed by a set of activities (i.e., test design, implementation and execution), with the goal of checking whether the requirements identified are satisfied by the formalization and analysis of their expected behaviour. This testing framework can be used in different types of ontology development life-cycles, or concerning other goals such as conformance testing between ontologies. In addition to this, we propose an RDF vocabulary to store, publish and reuse these test cases and their results, in order to allow traceability between the ontology, the test cases and their requirements.”

Isabel García Contreras. ETSI INFORMÁTICOS

Doctorado en Inteligencia Artificial

Director de tesis: Manuel Hermenegildo

Título: ***Code. Analyze. Repeat. Incremental and Modular Static Program Analysis.***

“Static program analysis is widely used for automatically inferring program properties such as correctness, robustness, safety, cost, etc. In particular, abstract interpretation is a theory used to reason about the (possibly infinite) executions of a program in a finite way, without actually executing the program.

Performing such analysis during software development helps in bug detection and reporting, but given the size and complex structure of real-life programs, combining system libraries and third party software, such analysis can be expensive. Triggering a complete reanalysis for each set of changes is often too costly. However, in practice development iterations normally involve small modifications, isolated inside a small number of files or components. In my thesis I study how to reduce the cost of re-analysis by reusing previous information, taking advantage of the characteristics of the changes.”

Marjan Najafabadipour. ETSI INFORMÁTICOS

Doctorado en Software, Sistemas y Computación

Director de tesis: Ernestina Menasalvas Ruiz

Título: ***Constructing the Patient’s Medical Time-line from Electronic Health Records***

“It is crucial for clinicians to have a complete and precise knowledge of the patient’s medical history, which includes disease and its progression over time and in chronological order. Retrieval of the patient’s medical history improves clinical document summarization, clinical trial recruitment, clinical decision making and patient’s survival time calculation. In addition, accessing such a medical history allows clinicians to evaluate the quality of the healthcare given and to highlight the steps where specific care should be provided to the patient. Traditionally, all the information collected about the patient’s medical history such as sign and symptoms, diagnoses, laboratory tests, treatments, etc. were written on the papers by clinicians and were stored as part of the medical history of the patient. Towards the digitization of clinical data, this information is stored in the computerized clinical records, known as “Electronic Health Records (EHRs)”. EHRs are textual clinical documents, which describe various medical events related to the patient’s clinical condition and include information about when these medical events have occurred. While EHRs contain comprehensive information about the patient’s time-line, it is costly and time-consuming to manually read and extract such time-line when the information is stored in large amounts of EHRs with different formats. In order to automatically derivate the patient’s medical time-line from EHRs, it is necessary to extract information about medical concepts, time expressions, temporal relations and the order of medical events from clinical texts. However, extraction of this information from free texts of EHRs is very challenging due to the textual nature of information locked in EHRs, their domain specific nature and their writing quality. Therefore, the aim of this doctoral thesis is to introduce a new rule-based NLP system, capable of extracting lung cancer domain specific medical metrics, time expressions, temporal relations and the order of medical events from EHRs, written in Spanish. By using a large dataset of EHRs comprising information about the patients suffering from lung cancer, we show that our framework has an adequate level of performance by correctly building the time-line for 44 patients from a pool of 50 patients.”

María Navas Loro. ETSI INFORMÁTICOS

Doctorado en Inteligencia Artificial

Director de tesis: Víctor Rodríguez-Doncel y Asunción Gómez-Pérez

Título: ***Temporal Expressions and Events in the Legal Domain***

“Legal texts are long, complex and extremely difficult to read to people out of the legal domain. This thesis tries to solve this by using Natural Language Processing techniques in order to detect Temporal Expressions (like dates and references to durations) and relevant events in legal judgments. By doing this, it will be possible to represent long and complicated sentences of hundreds of pages in a event-centric semantic way, that at the same time will allow us to generate alternative easy-to-understand representations, such as summaries, timelines or even event-based searches, that will help lawyers to find similar cases based based on what happened instead of using some keywords. This work does not only benefit people in the legal domain, by helping them in their everyday tasks; it also allows people being able to understand legal judgments on their own, taking closer people and justice.”

Gastón Olivares Fernández. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Sistemas Complejos

Director de tesis: Juan Carlos Losada González

Título: ***Cartografía y análisis de redes de colaboración científica y redes sociales***

"This work consists of a series of studies, from scientific collaboration to the analysis of political conversations on Twitter, through complexity science and big data. First, scientific collaboration plays a fundamental role in the scientific development, especially when interdisciplinarity allows the generation of new knowledge areas. This is why we have developed methodologies to visualize the network structures that we call knowledge cartographies, which correspond to a graphic representation of the disciplinary interactions of 14 countries, To prognosticate which of these will be developed in the future. Secondly, we analyze political conversations through

Twitter, through the users interactions. This work allowed us to understand the evolution of the opinion of the voters during the last week of the campaign of the presidential elections in Chile in 2017, and we found a very strong correlation between our results and the real percentage of votes obtained by each candidate."

Leonardo Suriano ETSI INDUSTRIALES

Doctorado en Ingeniería Eléctrica y Electrónica

Director de Tesis Eduardo de la Torre

Titulo ***Hardware/Software Desing Exploration in Complex Heterogeneous Systems***

"Heterogeneous Multiprocessors Systems-on-a-Chip (MPSoCs) with programmable hardware acceleration are currently gaining market share in the embedded device domain. Largest MPSoCs combine several software processing cores with programmable logic. In these systems, reaching the optimal implementation performance is difficult because many manual and time-consuming steps are required to build, from the application specification, a prototype with measurable performances. In this PhD, a complete tool is proposed that, based on state-of-the-art tools and High-Level Synthesis, deploys a whole hardware-software rapid prototype from a unique dataflow-based application representation. Thanks to it, many Design Space Exploration (DSE) can be conducted in order to find the most performing architectural solution, and a compilable/synthesizable code is generated."

Iván González Torre. ETSI AGRONOMICA ALIMENTARIA Y DE BIOSISTEMAS

Doctorado en Sistemas Complejos

Director de Tesis: Bartolomé Luque

Titulo: ***Criticality and linguistic laws in human voice***

"Linguistic laws constitute one of the quantitative cornerstones of modern cognitive sciences and have been routinely investigated in written corpora, or in the equivalent transcription of oral corpora. This means that inferences of statistical patterns of language in acoustics are biased by lossing the information and variability of the acoustic physical magnitudes. We study linguistic laws in human voice at phoneme, word and Breathe Group level using written and speech magnitudes, relating each other and giving a global perspective of the on-going interaction processes. We propose a model that explains the duration distribution at higher levels based only on the information at phonemic level and we formulate the Zipf's brevity of law based on the information theory explanation."

VIERNES 10 de Mayo

11. 30 h: Ponencia: “Objetivos de Desarrollo Sostenible (ODS)”

D. Miguel Soberón (ITD UPM)

11. 45 h: Gran final “Cuéntanos tu tesis”, Simposio Doctorado UPM 2019

con la participación de los finalistas de las distintas áreas doctorales.

13:00 h. Entrega de premios (Primer y Segundo premio y Premio especial del público), diplomas y premios de finalistas y certificados de participación.

D. Guillermo Cisneros Pérez. Rector UPM.