

PhD research lines open to CSC scholarship applicants under cooperative agreement

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Agroengineering

- 1) **Innovative strategies of rhizo-phyto-remediation to monitor and mitigate pollution & CO2 in smart cities**
Prof. Luis G. García-Montero
Email: luisgonzaga.garcia@upm.es
- 2) **The effects of flow regulation by large dams on macrobenthos and on riparian vegetation**
Prof. Diego García de Jalón
Email: diego.gjalon@upm.es
- 3) **Recovery and reuse of rubber in building construction**
Prof. Justo García Navarro and Ana Jiménez Rivero
Email: justo.gnavarro@upm.es ana.jimenez@upm.es
- 4) **Innovations in life cycle analysis (LCA) for agri-food chain**
Prof. Eva Cristina Correa and Guillermo San Miguel
Email: evacristina.correa@upm.es g.sanmiguel@upm.es
- 5) **Precision livestock farming: data and technology for welfare, efficiency and sustainability**
Prof. Belén Diezma Iglesias
Email: belen.diezma@upm.es
- 6) **Modelling urban and rural catchments with sustainable urban drainage systems**
Prof. Leonor Rodríguez-Sinobas and Sergio Zubelzu
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- 7) **Hydrological monitoring and modelling aided by cutting-edge sensor techniques and Artificial Intelligence algorithms**
Prof. Sergio Zubelzu
Email: sergio.zubelzu@upm.es
- 8) **Interference of signal perception functions in phytopathogenic bacteria as an alternative strategy to crop disease control**
Emilia López Solanilla
Email: emilia.lopez@upm.es
- 9) **Valuation of investments in infrastructure in an environment of uncertainty. Application to desalination plants**
Prof. Antonio Lorenzo Lara Galera
Email: antoniolorenzo.lara@upm.es
- 10) **Addressing the Impact of Ultra Violet Radiation on Fungal Biology and Possible Applications on Control of Fungal Plant Pathogens**
Prof. Miguel Angel Muñoz; Daniel Palmero
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11) Calculation of dasometric data from terrestrial laser point clouds

Prof. Jose Juan Arranz Justel

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12) Joint recurrence plots of vegetation indices and climate

Prof. Ana M. Tarquis

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Biotechnology and bioinformatics

1) Plant allergens

Prof. Araceli Díaz Perales

Email: araceli.diaz@upm.es

2) Tree biotechnology: biomass production and environmental applications

Prof. Luis Gómez

Email: luis.gomez@upm.es

3) Plant virus biotechnology

Prof. Fernando Ponz

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4) Regulatory networks in the seed: integration of development, metabolism and environmental conditions

Prof. Jesús Vicente-Carbajosa

Email: jesus.vicente@upm.es

5) Molecular basis of nitrogen and sulphur responses in plants

Prof. Joaquín Medina

Email: medina.joaquin@inia.es

6) Regulation of the molecular responses to nitrogen and oxygen limitation in plants

Prof. Joaquín Medina

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7) Engineering evolution-proof synthetic communities for plant growth promotion

Prof. Alejandro Couce

Email: a.couce@upm.es

8) Developing tools for wheat quality breeding

Prof. Elena Benavente and Laura Pascual

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Computational systems biology and genomics

- 1) **Computational evolutionary genomics**
Prof. Jaime Huerta-Cepas
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- 2) **Synthetic biology of plant signaling circuits**
Prof. Krzysztof Wabnik
Email: k.wabnik@upm.es
- 3) **FAIR data infrastructures and computational agents for bio/medicine**
Prof. Mark Wilkinson
Email: mark.wilkinson@upm.es
- 4) **Ecological/evolutionary processes in microbial communities**
Prof. Jaime Iranzo
Email: jaime.iranzo@upm.es
- 5) **Genomic assisted breeding lab**
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Interactions of plants with environment

- 1) **Regulation of translation and quality control during abiotic stress conditions in plants**
Prof. Mar Castellano Moreno
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- 2) **Molecular plant-pest interactions**
Prof. Isabel Díaz
Email: i.diaz@upm.es
- 3) **Plant-virus interaction and co-evolution**
Prof. Fernando García-Arenal
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- 4) **Metal homeostasis in plant-microbe interactions**
Prof. Manuel González-Guerrero
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- 5) **Phytopathogenic bacteria**
Prof. Emilia López Solanilla and Pablo Rodríguez Palenzuela
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- 6) **Plant innate immunity mediated by cell wall-derived glycans**
Prof. Antonio Molina
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- 7) Associations of symbiotic bacteria with plants
Prof. José Manuel Palacios
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- 8) Biochemistry of nitrogen fixation
Prof. Luis M. Rubio
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- 9) Virus-fungus-plant interaction
Prof. María Ángeles Ayllón
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- 10) Ecological and molecular factors involved in fungal endophytism and pathogenesis
Prof. Soledad Sacristán
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- 11) Transgene silencing in plant biotechnological applications
Prof. Elena Caro
Email: elena.caro@upm.es
- 12) Determinants of plant virus seed transmission and speciation
Prof. Israel Pagán
Email: jesusisrael.pagan@upm.es
- 13) Discovering novel pest control strategies by dissecting molecular plant-pest interactions
Prof. Manuel Martínez Muñoz
Email: m.martinez@upm.es
- 14) Type VI secretion systems in endosymbiotic bacteria
Prof. Luis Rey
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Plant development

- 1) Seasonal and circadian control of growth-dormancy cycle in trees
Prof. Isabel Allona
Email: isabel.allona@upm.es
- 2) Phenotypic and molecular analysis of crop natural variation
Prof. Rosa Arroyo
Email: rarroyo@inia.es
- 3) Molecular bases of plant developmental phase transitions
Prof. José A. Jarillo and Manuel Piñeiro
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- 4) **Root organogenesis, regeneration and rooting**
Prof. Miguel Ángel Moreno Risueño
Email: miguelangel.moreno@upm.es
- 5) **Developmental study of root systems and their adaptation to soil and environmental factors: from model plants to crops**
Prof. Mónica Pernas
Email: pernas.monica@inia.es
- 6) **Plant hormonal regulatory networks**
Prof. Stephan Pollmann
Email: stephan.pollmann@upm.es
- 7) **Regulation of lateral root development during nutrient deficiencies**
Prof. Juan Carlos del Pozo
Email: pozo@inia.es
- 8) **Effect of climate change in root-associated microbiome and plant nutrition**
Prof. Juan Carlos del Pozo
Email: pozo@inia.es
- 9) **Epigenetic regulation of agronomic traits**
Prof. Pedro Crevillen
Email: crevillen.pedro@inia.es
- 10) **Discovering novel pest control strategies by dissecting molecular plant-pest interactions**
Prof. Manuel Martínez Muñoz
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Applied Mathematics

- 1) **Quantum chaos**
Prof. Fabricio Macia
Email: fabricio.macia@upm.es
- 2) **Numerical approximation and control for systems governed by partial differential equations**
Associated faculty: Pablo Angulo, Carlos Castro, Fabricio Macia, Ernesto Nungesser
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- 3) **Relativistic kinetic theory**
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- 4) Theoretical and numerical study of differential equations with applications in populations dynamics, ecology and epidemiology
Prof. Andrea Tellini
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- 5) Design optimization of Lithium-ion batteries through mathematical models
Luis Sanz Lorenzo and Pedro Galán Del Sastre
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- 6) Use of models for the containment of the Covid 19 pandemic
Prof. Luis Sanz Lorenzo
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- 7) Lie Systems and Geometric Mechanics
Prof. Cristina Sardón
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Biomedical Engineering

- 1) Personalized decision support tools for patients and for healthcare professionals
Prof. Enrique J. Gómez Aguilera
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- 2) Telemedicine platforms and personal health devices
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Email: enriquejavier.gomez@upm.es
- 3) Algorithms for monitoring physical activity
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- 4) Artificial pancreas
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- 5) Models for glucose prediction
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- 6) Medical image and video analysis
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- 7) Technology enhanced learning for minimally invasive surgery
Prof. Enrique J. Gómez Aguilera
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- 8) Image and video guide surgery and robotics
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- 9) VR/AR for surgical training
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- 10) Intelligent monitoring of cognitive and physical rehabilitation
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- 11) Interactive virtual environments and neurorehabilitation content development and management technologies
Prof. Enrique J. Gómez Aguilera
Email: enriquejavier.gomez@upm.es
- 12) Knowledge management and data mining applied to neurorehabilitation/brain health data to generate clinical evidence
Prof. Enrique J. Gómez Aguilera
Email: enriquejavier.gomez@upm.es
- 13) Analysis and classification of structural alterations resulting from an acquired brain injury based on medical imaging
Prof. Enrique J. Gómez Aguilera
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- 14) Tele-neurorehabilitation technologies and systems
Prof. Enrique J. Gómez Aguilera
Email: enriquejavier.gomez@upm.es
- 15) Biomedical technologies for brain health
Prof. Enrique J. Gómez Aguilera
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- 16) Degradation analysis of bioabsorbables stents in coronary bifurcations based on their diffusion in the blood flow. fluid dynamic models
Prof. Javier García
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- 17) Thrombosis risk assesment in the left atrial appendage using computational fluid dynamics
Prof. Javier García
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- 18) Mechanical modeling of arterial wall in biological tissues
Prof. José Merodio
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- 19) Mechanical modeling of poroelastic materials and its application to cancer mechanics
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Email: jose.merodio@upm.es
- 20) Construction of longitudinal predictive models for the early detection of some neurodegenerative diseases (Alzheimer's and Parkinson's) using neuroimaging and data mining
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- 21) Programmable biology
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- 22) Systems biology
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- 23) DNA computing
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- 24) Synthetic biology
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Email: arpaton@fi.upm.es
- 25) Artificial intelligence applied to biomedicine
Prof. Alfonso Rodríguez-Patón
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- 26) Research on energy-saving feedback-based methods to manage resource allocation to multimedia applications in multicore embedded systems
Dr. Ángel M. Groba González
Email: angelmanuel.groba@upm.es
- 27) Deep learning for biomedical and health applications
Prof. David Luengo García
Email: david.luengo@upm.es
- 28) Artificial intelligence for biomedical and health applications
Prof. Juan Ignacio Godino-Llorente
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- 29) Artificial intelligence and signal processing for the evaluation of neurodegenerative disorders
Prof. Juan Ignacio Godino-Llorente
Email: ignacio.godino@upm.es
- 30) Artificial intelligence and image processing for the evaluation of COVID-19 disease
Prof. Juan Ignacio Godino-Llorente
Email: ignacio.godino@upm.es
- 31) Complexity analysis of biomedical signals
Prof. Juan Ignacio Godino-Llorente
Email: ignacio.godino@upm.es
- 32) Radar technology for monitoring biomedical signs in biomedical and health applications
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Email: ignacio.godino@upm.es
- 33) T-cell biophysics and aging
Prof. Gustavo R. Plaza
e-mail: gustavo.plaza@upm.es
- 34) New technologies for cell-deformability studies
Prof. Gustavo R. Plaza
e-mail: gustavo.plaza@upm.es
- 35) Computational Cognitive Modelling
Prof. María Dolores del Castillo
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- 36) Human-Computer Interaction for people with motor and cognitive disorders
Prof. María Dolores del Castillo
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- 37) Cognitive and Movement Neurophysiology
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- 38) Neurorehabilitation
Prof. Eduardo Rocón.
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- 39) Neurorehabilitation – Parkinson
Prof. Eduardo Rocón.
Email: e.rocon@upm.es
- 40) IoT and mobile solutions for frailty monitoring in elder patients
Prof. Xavier Ferre
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41) ICT solutions for an active and healthy ageing

Prof. Xavier Ferre

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Chemical Engineering

1) New methodologies for process safety

Prof. Manuel Rodriguez Hernandez

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2) Machine learning and digitalization in the process industry

Prof. Manuel Rodriguez Hernandez

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Civil Engineering and Architecture

1) Cars connected with the asphalt pavement to receive information about the road

Prof. Juan Gallego Medina

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2) Assessment of contingent rights in transport infrastructure

Prof. Antonio L. Lara Galera

Email: antoniolorenzo.lara@upm.es

3) Management and financing of local roads

Prof. Antonio L. Lara Galera

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4) Governor tuning contribution to increase non-synchronous generation in power systems

Prof. José Ángel Sánchez Fernández

Email: joseangel.sanchez@upm.es

5) Road geometric design

Prof. María Castro Malpica

Email: maria.castro@upm.es

6) Incident and reflected waves. Measurements in basin in laboratory tests

Prof. José Santos López Gutiérrez

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- 7) **Design of breakwaters using neuronal networks**
Prof. José Santos López Gutiérrez
Email: josesantos.lopez@upm.es
- 8) **Subjective analysis of the effect of low frequencies on the façades of dwellings**
Prof. María Ángeles Navacerrada Saturio
Email: mdelosangeles.navacerrada@upm.es
- 9) **Machine learning based algorithms for smoke detection using video application to early detection of fires in open spaces**
Prof. Matías J. Garrido González
Email: matias.garrido@upm.es
- 10) **Dynamics of bridges under high-speed railway traffic**
Prof. José M. Goicolea
Email: jose.goicolea@upm.es
- 11) **Recovery and reuse of rubber in building construction.**
Prof. Justo García Navarro and Ana Jiménez Rivero
Email: justo.gnavarro@upm.es ana.jimenez@upm.es
- 12) **Circular Economy of Constructions Products**
Prof. Justo García Navarro
Email: justo.gnavarro@upm.es
- 13) **Spatial and urban effects of electronic commerce**
Prof. Rosa M. Arce Ruiz and Julio Alberto Soria Lara
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- 14) **Environmental and socioeconomic impacts of infrastructures**
Prof. Rosa M. Arce Ruiz and Julio Alberto Soria Lara
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- 15) **Evaluation of smart cities**
Prof. Rosa M. Arce Ruiz and Julio Alberto Soria Lara
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- 16) **Uncertainty quantification based on vibration testing for stochastic modeling of civil engineering structures**
Prof. Javier Fernando Jiménez-Alonso
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- 17) **Modeling of material instabilities with application to fiber reinforced composite failure**
Prof. José Merodio
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- 18) Buckling of structural elements
Prof. José Merodio
Email: jose.merodio@upm.es
- 19) Wave propagation: Rayleigh and Lamb waves
Prof. José Merodio
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- 20) Climate change, environmental planning and urban health
Prof. Ester Higuera García
Email: ester.higuera@upm.es
- 21) Gender and diversity in urban planning and architecture
Prof. Inés Sánchez de Madariaga
Email: i.smadariaga@upm.es
- 22) Spatial accessibility, proximity-based cities and sustainable mobility
Prof. Patxi Lamíquiz Daudén
Email: francisco.lamiquiz@upm.es
- 23) Urban Complexity & Spatial Resilience – Contemporary Urban Processes. Planning, Adaptation and Urban Policies under Uncertainty: Climate Change, Crisis, Catastrophes & Conflicts
Prof. Javier Ruiz Sánchez
Email: javier.ruiz@upm.es
- 24) Strategic planning, foresight and governance
Prof. José Miguel Fernández Güell
Email: josemiguel.fernandez@upm.es
- 25) Urban Regeneration Policies
Sonia de Gregorio Hurtado
Email: sonia.degregorio@upm.es
- 26) Urban challenges of the Global South in 21st Century
Eva Álvarez de Andrés
Email: eva.alvarez@upm.es
- 27) Planning Theory and History: Spatial Justice
Álvaro Sevilla Buitrago
Email: alvaro.sevilla@upm.es
- 28) Automatic generation of BIM models from architectural model-oriented point clouds
Prof. Jose Juan Arranz Justel
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- 29) Automatic calculation of the digital twin and asset inventory of communication routes (roads and railways) by means of panoramic images and LiDAR data

Prof. Jose Juan Arranz Justel

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- 30) Cataloguing of buildings from aerial images and LiDAR data

Prof. Jose Juan Arranz Justel

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Environmental Engineering & Energy

- 1) Development of sustainable biorefinery extraction processes using green solvents

Prof. Manuel Rodríguez Hernández

Email: maria.gonzalezmiquel@upm.es

- 2) Modelling, simulation and optimization of multi-product sustainable bio-refineries

Prof. Ismael Díaz Moreno

Email: ismael.diaz@upm.es

- 3) Obtention of High Value Bio-products from Citrus Wastes

Prof. Ismael Díaz Moreno

Email: ismael.diaz@upm.es

- 4) Urban air quality

Prof. Rafael Borge García

Email: rborge@etsii.upm.es

- 5) Molecular simulation on organic semiconductors for solar cells and energy applications

Prof. Salvador León Cabanillas

Email: salvador.leon@upm.es

- 6) Social strategies to reduce greenhouse effect

Prof. Fernando Barrio Parra

Email: fernando.barrio@upm.es

- 7) Photocatalytic processes for water depollution

Prof. Antonio Nieto-Márquez Ballesteros

Email: antonio.nieto@upm.es

- 8) Safety analysis of Small Modular Reactors

Prof. César Queral

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- 9) Simulation of experimental tests performed in ACME facility
Prof. César Queral
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- 10) Sustainable material based on cellulose to improve waste water treatments: development of catalyst and new technologies to apply in wastewater and /or disinfection
Prof. Isabel Carrillo, Noemi Merayo
Email: isabel.carrillo@upm.es; n.merayo@upm.es

- 11) Development of novel, sustainable, urban, and industrial (waste)water treatment processes
Dr. Stefanos Giannakis
Email: stefanos.giannakis@upm.es

- 12) Elimination of contaminants of emerging concern (CECs) by Advanced Oxidation Processes
Dr. Stefanos Giannakis
Email: stefanos.giannakis@upm.es

- 13) The fundamentals governing microorganism disinfection (bacteria, viruses, fungi, algae)
Dr. Stefanos Giannakis
Email: stefanos.giannakis@upm.es

- 14) Photochemistry and photobiology of natural waters
Dr. Stefanos Giannakis
Email: stefanos.giannakis@upm.es

- 15) Development of drinking water treatment processes for developing countries: Solar disinfection
Dr. Stefanos Giannakis
Email: stefanos.giannakis@upm.es

- 16) Forest management using multi-criteria decision-making methods
Prof. Luis Diaz Balteiro
Email: luis.diaz.balteiro@upm.es

- 17) Strategic environmental assessment and hydrological plans. Sea effectiveness
Prof. Rosa M. Arce Ruiz and Julio Alberto Soria Lara
Email: rosa.arce.ruiz@upm.es julio.soria-lara@upm.es

- 18) Marine energies. scour protection and design expressions in monopiles foundations
Prof. José Santos López Gutiérrez
Email: josesantos.lopez@upm.es

- 19) Marine energies. diffraction effects and shoreline evolution in offshore wind farms. Comparison between GBFs and monopiles
Prof. José Santos López Gutiérrez
Email: josesantos.lopez@upm.es

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- 20) Marine energies. analysis of different types of foundations
Prof. María Dolores Esteban Pérez
Email: mariadolores.esteban@upm.es
- 21) Marine energies. floating structures: mooring line studies
Prof. Vicente Negro Valdecantos
Email: vicente.negro@upm.es
- 22) Degradation of pharmaceuticals and other contaminants of emerging concern from water media
Prof. Antonio Juan Dos Santos-García
Email: aj.dossantos@upm.es
- 23) Photoreforming: to produce hydrogen (H₂) from water and to remove organic pollutants and microplastics from the environment
Prof. Antonio Juan Dos Santos-García
Email: aj.dossantos@upm.es
- 24) Multivariate models of time series: application to the prediction of electricity demand
Prof. Jesús Juan Ruiz
Email: jesus.juan@upm.es
- 25) Design, simulation and optimization of non conventional rectification configurations
Prof. José Antonio Díaz López
Email: Jose.dlopez@upm.es
- 26) Ecodesign and ecoinnovation
Prof. Álvaro Ramírez
Email: alvaro.ramirez@upm.es
- 27) Advanced oxidation processes for the water and wastewater treatment
Prof. María José Martín de Vidales Calvo
Email: mariajose.martindevidales@upm.es
- 28) Soiling effect on solar panels, consequences in the energy production, and application to agrivoltaic systems
Prof. Miguel Ángel Muñoz García
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ICTs

Artificial intelligence and cognitive technologies

- 1) **Distributed and shared reality**
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- 2) **Deep learning for visual computing**
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- 3) **Deep learning for medical imaging**
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- 4) **User experience in immersive environments**
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- 5) **Point cloud compression**
Prof. Narciso García
Email: narciso@gti.ssr.upm.es
- 6) **Machine learning based algorithms for smoke detection using video application to early detection of fires in open spaces**
Prof. Matías J. Garrido González
Email: matias.garrido@upm.es
- 7) **Artificial intelligence for biomedical and health applications**
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Email: ignacio.godino@upm.es
- 8) **Artificial intelligence and signal processing for the evaluation of neurodegenerative disorders**
Prof. Juan Ignacio Godino-Llorente
Email: ignacio.godino@upm.es
- 9) **Artificial intelligence and image processing for the evaluation of COVID-19 disease**
Prof. Juan Ignacio Godino-Llorente
Email: ignacio.godino@upm.es
- 10) **Complexity analysis of biomedical signals**
Prof. Juan Ignacio Godino-Llorente
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- 11) Radar technology for monitoring biomedical signs in biomedical and health applications
Prof. Juan Ignacio Godino-Llorente
Email: ignacio.godino@upm.es
- 12) Artificial intelligence: ontologies, knowledge graphs, semantic technologies, linked data, natural language processing, multilingualism, data driven language technologies, machine learning.
Prof. Asunción Gómez and Raúl Garcia
Email: rgarcia@fi.upm.es
- 13) Smart maintenance and digital twins in Industry
Prof. Joaquín Ordieres Meré
Email: j.ordieres@upm.es
- 14) Artificial intelligence in finance
Prof. Joaquín Ordieres Meré
Email: j.ordieres@upm.es
- 15) Artificial intelligence in decision making processes involving energy management and operations looking to improve the SDGs
Prof. Joaquín Ordieres Meré
Email: j.ordieres@upm.es
- 16) Massive astrophysical data analysis and modelling
Prof. Joaquín Ordieres Meré
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- 17) Cognitive Production Systems.
Prof. Rodolfo Haber
Email: rodolfo.haber@upm.es
- 18) Control and optimization of Cyber-Physical Systems.
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Email: rodolfo.haber@upm.es
- 19) Self-Learning and Self-Reconfiguration in Industrial IoT.
Prof. Rodolfo Haber
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- 20) Social intelligence: graph analysis, social network analysis, social simulation, artificial and hybrid societies
Prof Javier Bajo, Emilio Serrano
Email: Javier.bajo@upm.es, emilio.serrano@upm.es
- 21) Green computing: automatic optimization of the energy consumption of software
Prof Manuel Hermenegildo
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- 22) Analysis and verification of resources in smart contracts and blockchain platforms of software
Manuel Hermenegildo
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- 23) Design and implementation of combined static/dynamic, logic-based programming languages
Manuel Hermenegildo
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- 24) Knowledge graphs: construction and exploitation
Oscar Corcho
Email: oscar.corcho@upm.es
- 25) Natural language processing techniques combined with knowledge graphs
Oscar Corcho
Email: oscar.corcho@upm.es
- 26) Real-world data for clinical trials: secondary use of EHR in research
David Pérez del Rey
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- 27) Machine learning techniques for the analysis of signals in industry or health
Prof. Carlos Eduardo González Guillén
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- 28) Serious games for physical rehabilitation
Prof. Martina Eckert
Email: martina.eckert@upm.es
- 29) Machine learning for personalized exergames
Prof. Martina Eckert
Email: martina.eckert@upm.es
- 30) Machine learning for natural interfaces
Prof. Martina Eckert
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Electronic engineering and telecommunications technologies

- 1) Modelling electrical weaknesses in electrical insulation systems
Prof. Ricardo Albarracín
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- 2) Partial discharge detection and analysis
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- 3) Measurement of partial discharges with antennas
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Email: ricardo.albarracin@upm.es
- 4) Evaluation of electrical insulation system
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- 5) Condition monitoring of power transformers
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- 6) Development of a space docking mechanism with embedded near field communication
Prof. Pedro Cobos Arribas
Email: pedro.cobos@upm.es
- 7) Interactions between surface acoustic waves and ferromagnetic nanostructures for future communication technologies
Prof. José Luis Prieto Martín
Email: joseluis.prieto@upm.es
- 8) 2D Materials for spin-orbitronics and the new generation of magnetic nano-devices
Prof. Javier Grandal Quintana
Email: javier.grandal@upm.es
- 9) Design and development of innovative and ecological strong permanent magnets using nanoscience and nanotechnology
Prof. Mariana de Jesús Paiva Proença
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- 10) Applied electromagnetism: transient potentials in grounding systems including thermal and corrosion effects due to contact with the ground. Applications to lightning strikes and to the interconnection between remote grounding system
Prof. Eduardo Faleiro
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- 11) Spatial statistical modeling of sound
Prof. Rubén Fraile Muñoz
Email: r.fraile@upm.es
- 12) Efficient SoPC architectures to be used as accelerators for the implementation of video CODECs compliant with the future ISO/IEC Versatile Video Coding standard
Prof. Matías J. Garrido González
Email: matias.garrido@upm.es
- 13) Novel cybersecurity solutions for edge and fog computing
Prof. José-Fernán MARTINEZ-ORTEGA (Head of GRyS research group)
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- 14) Ubiquitous services and protocols for autonomous systems
Prof. José-Fernán MARTINEZ-ORTEGA (Head of GRyS research group)
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- 15) Semantic framework for secure and discoverable cyber-physical systems
Prof. José-Fernán MARTINEZ-ORTEGA (Head of GRyS research group)
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- 16) Performance and resilience on cyber-physical systems
Prof. José-Fernán MARTINEZ-ORTEGA (Head of GRyS research group)
Email: jf.martinez@upm.es
- 17) Contributions to automated mission planning for uncertain environments
Prof. José-Fernán MARTINEZ-ORTEGA (Head of GRyS research group)
Email: jf.martinez@upm.es
- 18) Semantics for automated mission planning in uncertain domains
Prof. José-Fernán MARTINEZ-ORTEGA (Head of GRyS research group)
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- 19) Mission planning in uncertain domains based on decision processes
Prof. José-Fernán MARTINEZ-ORTEGA (Head of GRyS research group)
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- 20) A [high,mid] level task learning based on low level task composition
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Email: jf.martinez@upm.es
- 21) 5G Communications in high speed railway
Prof. Cesar Briso Rodríguez
Email: cesar.briso@upm.es
- 22) Design and fabrication of organic photonic integrated circuits by direct laser writing
Prof. Xabier Quintana Arregui
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- 23) GNSS Spoofing, Detection, and Mitigation
Prof. Prof. Antonio Pérez Yuste
Contact: antonio.perez@upm.es; 微信: panyuan-2013
- 24) Short-Range Wireless Communications (SRWC)
Prof. Prof. Antonio Pérez Yuste
Contact: antonio.perez@upm.es; 微信: panyuan-2013
- 25) 5G Communications: Theoretical study of NR sidelink relay
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26) 5G Communications: Development and implementation of Relay Nodes (RNs) in SDR (Software Defined Radio) Platforms in mmWs

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Software engineering and applications software

1) UX design for older users

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Industrial Management

1) Design oriented to global challenges for improving the quality of life and innovation to promote social changes, industrial competitiveness and achieve sustainable development

Prof. Álvaro Ramírez

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2) Multivariate models of time series: application to the prediction of electricity demand

Prof. Jesús Juan Ruiz

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3) Statistical problems in the modal analysis of structures

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4) Estimation and prediction with varma models

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5) Identification, estimation and prediction of periodic arma models with multiple seasonalities

Prof. Jesús Juan Ruiz

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6) Time series analysis and its applications

Prof. Jesús Juan Ruiz

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7) Machine Learning and Multivariate Analysis

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8) Development of geometric integrators for hybrid control systems

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- Prof. María Barbero Liñán
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- 9) Geometric methods for multi-agent systems
Prof. María Barbero Liñán
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- 10) Laser based additive manufacturing
Prof. David Muñoz
Email: david.munoz@upm.es
- 11) Asset management by using building information modeling (BIM) and distributed ledger technologies (DLT)
Prof. Joaquín Ordieres Meré
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- 12) Organizational effects of adoption of Industry 4.0 paradigms for workers and companies
Prof. Joaquín Ordieres Meré
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- 13) Smart Maintenance through Industry 4.0 and Big Analytics
Prof. Joaquín Ordieres Meré
Email: j.ordieres@upm.es
- 14) Innovation and entrepreneurial ecosystems
Prof. Claudio Feijoo
Email: Claudio.feijoo@upm.es
- 15) Reaction-diffusion equations in population dynamics
Prof. Andrea Tellini
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- 16) Reaction-diffusion equations in population dynamics: Reaction-diffusion equations are a mathematical tool that can be used to model how a population moves – as a whole – and/or distributes in its habitat
Prof. Andrea Tellini
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- 17) Spatial and urban effects of electronic commerce
Prof. Rosa M. Arce Ruiz and Julio Alberto Soria Lara
Email: rosa.arce.ruiz@upm.es julio.soria-lara@upm.es
- 18) Environmental and socioeconomic impacts of infrastructures
Prof. Rosa M. Arce Ruiz and Julio Alberto Soria Lara
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19) Evaluation of smart cities

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20) Social strategies to reduce greenhouse effect

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Materials Engineering

1) Ultracold atomic gases

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2) Geometry of atomic and molecular systems

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3) Molecular simulation of the crystallization of systems with industrial applications: clathrates and polymers

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4) Photocatalysis

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5) Synthesis and characterization (X-Ray diffraction (XRD), transmission electron microscopy (TEM), electron diffraction (SAED), scanning electron microscopy (SEM))

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6) Nanoparticles (transition metal ferrites, layered hydroxides (LHD), perovskites)

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7) Photoreforming: to produce hydrogen (H₂) from water and to remove organic pollutants and microplastics from the environment

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8) Metamaterials for optics

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- 9) **Infrared quantum photodetectors**
Prof. Adrián Hierro Cano
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- 10) **Transparent conductive oxides for plasmonics**
Prof. Adrián Hierro Cano
Email: adrian.hierro@upm.es
- 11) **Novel quantum dot nanostructure architectures for quantum photonics**
Prof. José María Ulloa Herrero
Email: jmulloa@isom.upm.es
- 12) **Graphene-based porous membranes for medical and environmental applications**
Prof. Fernando Calle Gómez
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- 13) **Recovery and reuse of rubber in building construction**
Prof. Justo García Navarro and Ana Jiménez Rivero
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- 14) **Computer modelling on nanoparticle-based photocatalysts for microplastics revalorization**
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Mechatronics

- 1) **Inspection and maintenance robots: modular robotics**
Prof. Miguel Hernando
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- 2) **Collaborative robotics applied to search and rescue robots**
Prof. Jaime del Cerro Giner
Email: j.cerro@upm.es
- 3) **Machine learning technics for the analysis of signals in industry or health**
Prof. Carlos Eduardo González Guillén
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- 4) **Machine learning technics for the analysis of signals in industry or health**
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- 5) Laser bioprinting for tissue engineering
Prof. Sara Lauzurica
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- 6) Numerical modelling of laser additive manufacturing processes
Prof. Miguel Morales
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- 7) New laser based strategies for scaffold fabrication in tissue engineering
Prof. Carlos Molpeceres
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- 8) Development of wearable robots to improve neurocognitive and neuro-muscle rehabilitation at home
Prof. Cecilia García Cena
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- 9) Development of maintenance robots for offshore wind farm
Prof. Cecilia García Cena
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- 10) Underwater humanoid robots. Maintenance and inspection tasks.
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Email: cecilia.garcia@upm.es
- 11) Development of new programming environments for industrial robots
Prof. Alberto Brunete
Email: alberto.brunete@upm.es
- 12) Cost-effective robotic platform for human gait analysis for neurodegenerative pathologies evaluation
Prof. Alberto Brunete
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- 13) Cognitive Production Systems
Prof. Rodolfo Haber
Email: rodolfo.haber@upm.es
- 14) Control and optimization of Cyber-Physical Systems
Prof. Rodolfo Haber
Email: rodolfo.haber@upm.es
- 15) Self-Learning and Self-Reconfiguration in Industrial IoT
Prof. Rodolfo Haber
Email: rodolfo.haber@upm.es
- 16) Flexible manufacturing systems flow optimization
Prof. Roque Calvo
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- 17) Development of a calibration procedure for the evaluation of at-process optical measurements
Prof. Jesús Caja García and Piera Maresca
Email: jesus.caja@upm.es; piera.maresca@upm.es
- 18) Development of measurement models with 2D optical equipment in industrial environments for static and dynamic measurements
Prof. Piera Maresca and Jesús Caja García
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Sport Sciences

- 1) Martial arts, combat sports and women health
Prof. Alfonso López Díaz de Durana
Email: a.lopez@upm.es
- 2) Performance analysis in competition, mainly in team sports but also in individual sports. Coach behavior, leadership, relations coach-athlete, conditioning, strength and physical demands in sports
Prof. Jorge Lorenzo Calvo
Email: Jorge.lorenzo@upm.es
- 3) Physical activity and pregnancy
Prof. Rubén Barakat
Email: rubenomar.barakat@upm.es
- 4) Motivation and teaching in physical education settings
Prof. Javier Coterón López
Email: j.coteron@upm.es

Transportation Engineering

- 1) Aeroacoustic optimization of a high-speed train pantograph
Prof. Jorge Muñoz Paniagua
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- 2) Second-generation rans turbulence models for aeroacoustic applications
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- 3) **POD-based aerodynamic optimization applied to railway vehicles**
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- 4) **CFD analysis of a high-speed train crossing desert regions**
Prof. Jorge Muñoz Paniagua
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- 5) **Multi-objective study of the flow around a high-speed train bogie**
Prof. Jorge Muñoz Paniagua
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- 6) **Critical Communications in Metropolitan and high speed railway**
Prof. Cesar Briso Rodríguez
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- 7) **UAV(Drones) Communications and applications**
Prof. Cesar Briso Rodríguez
Email: cesar.briso@upm.es
- 8) **5G for IOT and vehicular Communications**
Prof. Cesar Briso Rodríguez
Email: cesar.briso@upm.es
- 9) **Advanced railway control systems (ertms, cbtc, virtual coupling, etc.)**
Jesús Felez Mindan
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- 10) **Automotive and transport design**
Prof. Álvaro Ramírez
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- 11) **5G Communications: Development of 5G systems in millimeter bands in railways scenarios: Application to channel modeling propagation and virtual coupling**
Prof. José Ignacio Alonso Montes.
E-mail: joseignacio.alonso@upm.es
- 12) **5G Communications: Channel Modeling Propagation inside of wagon railways and buses in millimeter bands: Application to IEEE802.11ad standard (60 GHz)**
Prof. José Ignacio Alonso Montes.
E-mail: joseignacio.alonso@upm.es
- 13) **Automatic digital reconstruction of power lines and their environment from LiDAR data for control and maintenance**
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14) Impact of kick scooters on urban mobility

Prof. José Manuel Vassallo and Juan Gómez Sánchez

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15) Impact of e-commerce on global mobility

Prof. José Manuel Vassallo and Juan Gómez Sánchez

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