

ALBERTO HORNERO

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ACADEMIC BACKGROUND

PH.D. IN PHYSICAL GEOGRAPHY

SWANSEA UNIVERSITY (UNITED KINGDOM), NEARING COMPLETION

ENGINEER'S DEGREE IN COMPUTER SCIENCE

UNIVERSITY OF CÓRDOBA (SPAIN), 2014

- GPA: 78.2
- Dissertation mark: Greatest Honours; *Summa Cum Laude*
- with an official certificate of correspondence to level 7 EQF, **MASTER'S DEGREE**

BSC IN COMPUTER ENGINEERING

UNIVERSITY OF CÓRDOBA (SPAIN), 2008

- GPA: 72.0
- Dissertation mark: *Distinction*

WORK EXPERIENCE

04. 2018 – PRESENT

SWANSEA UNIVERSITY.- COLLEGE OF SCIENCE

PREDOCTORAL FELLOW (PHD STUDENT)

- Quantitative estimation of vegetation traits and dynamics using high-resolution hyperspectral data, medium resolution satellite imagery, machine learning (ML), and radiative transfer modelling (RTM)
- Under the supervision of Prof. Peter R. J. North (Swansea University, UK) and Prof. Pablo J. Zarco-Tejada (University of Melbourne, Australia)

04. 2009 – PRESENT

[On leave of absence]

SPANISH NATIONAL RESEARCH COUNCIL

CHIEF COMPUTER ENGINEER

- Development of algorithms and methodologies for image processing and data analysis
- Configuration of UAV-based remote sensing acquisition systems
- Processing and analysing data collected from different sensors (thermal, multispectral, hyperspectral and LIDAR)
- Field data collection (Canopy LAI, leaf Chlorophyll fluorescence, pigments and spectra)
- Acquiring ground-based measurements applied for model-based atmospheric correction
- Spectral and radiometric calibration, and atmospheric and Flat-field corrections for thermal and hyperspectral sensors
- Photogrammetric processing and 3D spatial data generation
- Development of a plant physiological sensor networks using open-source hardware
- Participation in several projects at the National, European (FP7) and International level
- Contribution to several scientific publications

10. 2012 – 01. 2017

CODECTION S.L.

CO-FOUNDER & CTO (PART-TIME)

- Development of tailor-made hardware and software business lines
- Design of systems based on integrated PIC microcontrollers
- Analysis, implementation and deployment of hardware and software applications

04. 2008 – 04. 2009

TECNOVA, SYSTEMS AND ENGINEERING

PROGRAMMER ANALYST

- Development of custom applications in the hospital sector
- DB Administration: PostgreSQL, Oracle, MySQL, Informix, SQLServer and Dbase
- Administration of web servers and application servers

02. 2008 – 04. 2008

GRUPO LÓPEZ HERMANOS IT SYSTEM ADMINISTRATOR

- Custom programming of various HR applications
- Administration of web servers and databases

06. 2007 – 04. 2008

LINUX+ MAGAZINE COLUMNIST AND BETATESTER (PART-TIME)

- Columnist, betatester and reviewer of technical articles

02. 2005 – 04. 2016

LINUX HISPANO CO-OWNER AND EDITOR (PART-TIME)

- Website dedicated to GNU Linux with ~60K unique visitors/mo on April 2016

AWARDS AND FELLOWSHIPS

- 1st prize in *Premio Antico Fattore dell'Accademia dei Georgofili al ricercatore dell'Università di Pisa*. Category: Modern olive grove management and technologies. (Pisa, Italy, 05/06/2020)
- Short Term Scientific Mission – Coupled 3-D radiative transfer and fluorescence simulation from leaf to canopy scales. Sfax, Tunisia. Action #CA17134 (21/02/2020 to 09/03/2020)
- DTC GEO 29 – Detection of global photosynthesis and forest health from space. PhD Scholarship (Swansea University, 01/04/2018)
- 1st prize in the *2013 edition of Young Entrepreneurs Association Awards*, at Entrepreneur/University category (AJE Córdoba, 06/03/2013)
- Finalist in the *Fifth and Sixth edition of the Business Ideas Competition at the Technology Transfer Office from the University of Córdoba*. 3rd prize on 13/12/2011 (staff category), 1st prize on 13/12/2011 (student category) and 1st prize on 10/10/2012 (staff category)
- 3rd prize in the *Second edition of Photography Contest at ETSIAM, Higher Technical School of Agricultural and Forestry Engineering* (University of Córdoba, Spain, 14/05/2010)
- Student Internship at the *Data Processing Center. Municipal Water Company of Córdoba, Spain*. (01/03/2007 – 31/07/2007)

PATENTS

- **hyproQ** Hyperspectral Processing Application – CSIC Patent 487/2012 – Industrial property type: Software Imaging software to process and calibrate hyperspectral data as a stand-alone processing chain application
- **imapQ** Imagery processing application – CSIC Patent 1821/2013 - Industrial property type: Software Multipurpose image processing software to calibrate and process thermal and multispectral imagery

RESEARCH NETWORKING

- 02. 2019 – PRESENT **SIFCOMX** Modelling group member
Intercomparison exercise of canopy sun-induced chlorophyll fluorescence (SIF) models
- 10. 2018 – PRESENT **SENSECO** EU COST Action member
Optical synergies for spatiotemporal SENSing of Scalable ECOphysiological traits.

- 09.2018 – PRESENT **HYPERSENS** Research Team collaborator
Hyperspectral Remote Sensing & Precision Agriculture Laboratory
- 04. 2018 – PRESENT **GEMEO** Research Team member
Global Environmental Modelling and Earth Observation group
- 01. 2015 – 12.2018 **SIRENA** Scientific Excellence Network member
Techniques for improving N use efficiency in cropping systems
- 04. 2009 – PRESENT **QUANTALAB** Research Team member
Laboratory for Research Methods in Quantitative Remote Sensing

PUBLICATIONS IN ISI LISTED JOURNALS

- 2020. **Hornero, A.**, North, P.R.J., Zarco-Tejada, P.J., Rascher, U., Martín, M.P., Migliavacca, M., Hernández-Clemente, R., Assessing the influence of the understory in the interpretation of chlorophyll fluorescence retrieved from heterogeneous canopies through 3-D radiative transfer modelling, **Submitted**.
- 2020. Poblete, T., Camino, C., Beck, P.S.A., **Hornero, A.**, Kattenborn, T., Saponari, M., Boscia, D., Navas-Cortes, J.A., Detection of *Xylella fastidiosa* infection symptoms with airborne multispectral and thermal imagery: assessing bandset reduction performance from hyperspectral analysis, **ISPRS Journal of Photogrammetry and Remote Sensing**, 162, 27–40. <https://doi.org/10.1016/j.isprsjprs.2020.02.010>.
- 2020. **Hornero, A.**, Hernández-Clemente, R., North, P.R.J., Beck, P.S.A., Boscia, D., Navas-Cortes, J.A., Zarco-Tejada, P.J., Monitoring the incidence of *Xylella fastidiosa* infection in olive orchards using ground-based evaluations, airborne imaging spectroscopy and Sentinel-2 time series through 3-D radiative transfer modelling, **Remote Sensing of Environment**, 236, 111480. DOI: 10.1016/j.rse.2019.111480
- 2019. Hernández-Clemente R., **Hornero A.**, Mottus M., Penuelas J., Gonzalez-Dugo V., Jimenez-Muñoz J.C., Suárez-Barranco L., Alonso L., Zarco-Tejada P.J. Early diagnosis of vegetation health from high-resolution hyperspectral and thermal imagery. Lessons learned from empirical relationships and radiative transfer modelling, **Current Forestry Reports**, 5: 169. DOI: 10.1007/s40725-019-00096-1
- 2019. Zarco-Tejada, P.J., **Hornero, A.**, Beck, P.S.A., Kattenborn, T., Kempeneers, P., Hernández-Clemente, R. Chlorophyll content estimation in an open-canopy conifer forest with Sentinel-2 and hyperspectral imagery in the context of forest decline, **Remote Sensing of Environment**, 223, 320–335.
- 2019. Caruso, G., Zarco-Tejada, P.J., Gonzalez-Dugo, V., Moriondo, M., Tozzini, L., Palai, G., Rallo, G., **Hornero, A.**, Primicerio, J., Gucci, R., High-resolution imagery acquired from an unmanned platform to estimate biophysical and geometrical parameters of olive trees under different irrigation regimes, **PLoS ONE** 14(1): e0210804.
- 2018. Zarco-Tejada, P.J., Camino, C., Beck, P.S.A., Calderon, R., **Hornero, A.**, Hernández-Clemente, R., Kattenborn, T., Montes-Borrego, M., Susca, L., Morelli, M., Gonzalez-Dugo, V., North, P.R.J., Landa, B.B., Boscia, D., Saponari, M., Navas-Cortes, J.A., Pre-visual symptoms of *Xylella fastidiosa* infection revealed in spectral plant-trait alterations, **Nature Plants**, DOI: 10.1038/s41477-018-0189-7.
- 2018. Zarco-Tejada, P.J., **Hornero, A.**, Hernández-Clemente, R., Beck, P.S.A., Understanding the temporal dimension of the red-edge spectral region for forest decline detection using high-resolution hyperspectral and Sentinel-2a imagery, **ISPRS Journal of Photogrammetry and Remote Sensing**, 137, 134–148.
- 2017. Hernández-Clemente, R., North, P.R.J., **Hornero, A.**, Zarco-Tejada, P.J., Assessing the effects of forest health on sun-induced chlorophyll fluorescence using the FluorFLIGHT 3-D radiative transfer model to account for forest structure, **Remote Sensing of Environment**, 193, pp. 165-179.
- 2016. Vergara-Diaz, O., Zaman-Allah, M.A., Masuka, B., **Hornero, A.**, Zarco-Tejada, P.J., Prasanna, B.M., Cairns, J.E., Araus, J.L., A novel remote sensing approach for prediction of maize yield under different conditions of nitrogen fertilization, **Frontiers in Plant Science**, 7:666.
- 2015. Zaman-Allah, M.A., Vergara, O., Araus J.L., Tarekegne, A., Magorokosho, C., Zarco-Tejada, P.J., **Hornero, A.**, Albà, A., Das, B., Craufurd, P., Olsen, M., Prasanna, B.M., Cairns, J., Unmanned aerial platform-based multi-spectral imaging for field phenotyping of maize, **Plant Methods** 2015, 11:35.

- 2014. Hernández-Clemente, R., Navarro-Cerrillo, R.M., Romero Ramírez, F. J., **Hornero, A.**, Zarco-Tejada, P.J., A Novel Methodology to Estimate Single-Tree Biophysical Parameters from 3D Digital Imagery Compared to Aerial Laser Scanner Data, **Remote Sensing**, vol 6, ISSN 2072-4292, 11627-11648, doi:10.3390/rs6111627, 2014.

CONFERENCE ORGANIZATION AND CONTRIBUTIONS

- 2019. **Hornero, A.**, Hernández-Clemente, R., North, P.R.J., Beck, P.S.A., Boscia, D., Navas-Cortes, J.A., Zarco-Tejada, P.J. Spatio-temporal monitoring of *Xylella fastidiosa* in olive trees using radiative transfer models and Sentinel-2 images. "Detection and surveillance" session on the 2nd EU conference on *Xylella fastidiosa*. 29th-30th October 2019, Ajaccio, Corsica.
- 2019. Scholten, R., Martinez Sanchez, L., **Hornero, A.**, Navas-Cortés, J.A., Zarco-Tejada, P.J., Beck, P.S.A. Monitoring the impact of *Xylella* on Apulia's olive orchards using Sentinel-2 satellite data and aerial photographs. "Risk assessment and impact assessment" session on the 2nd EU conference on *Xylella fastidiosa*. 29th-30th October 2019, Ajaccio, Corsica.
- 2019. Caruso, G., Palai, G., Caruso, M., Roccuzzo, G., Stagno, F., Zarco-Tejada, P.J., Gonzalez-Dugo, V., **Hornero, A.**, Gucci, R. Using an unmanned platform and VIS-NIR cameras to determine biophysical and geometrical parameters of olive, grapevine and citrus canopies. International Symposium on Precision Management of Orchards and Vineyards, 7th-11th October 2019; Palermo, Italy.
- 2019. Zarco-Tejada, P.J., Camino, C., Beck, P.S.A., Calderon, R., **Hornero, A.**, Hernández-Clemente, R., Kattenborn, T., Montes-Borrego, M., Susca, L., Morelli, M., Gonzalez-Dugo, V., North, P.R.J., Landa, B.B., Boscia, D., Saponari, M., Navas-Cortes, J.A. Remote sensing detection of *Xylella fastidiosa* using airborne hyperspectral and thermal imagery: lessons learned from the European outbreaks. 2019 Australian Biosecurity Symposium, 12nd-13rd June 2019; Gold Coast, Queensland.
- 2019. Beck, P.S.A., **Hornero, A.**, Martinez-Sanchez, L., Scholten, R., Hernández-Clemente, R., North, P.R.J., Boscia, D., Navas-Cortes, J.A., Zarco-Tejada, P.J. Insights into the spread of *Xylella fastidiosa* in Italy, from early detection of symptoms to damage mapping through remote sensing from air and space. ESA Living Planet Symposium 2019: From Agriculture mapping to monitoring, 13th-17th May 2019; Milan, Italy.
- 2018. R. Calderon, C. Camino, P.S.A. Beck, **A. Hornero**, R. Hernández-Clemente, T. Kattenborn, M. Montes-Borrego, L. Susca, M. Morelli, V. Gonzalez-Dugo, P.R.J. North, B.B. Landa, D. Boscia, M. Saponari, P.J. Zarco-Tejada and J.A. Navas-Cortes. Detección pre-visual de la infección por *Xylella fastidiosa* en olivo a partir de imágenes hiperespectrales y térmicas. *Phytoma*, December 2018, Ed. 304.
- 2018. Beck, P.S.A., Zarco-Tejada, P.J., Camino, C., Calderon, R., **Hornero, A.**, Hernández-Clemente, R., Montes-Borrego, M., Susca, L., Morelli, M., Gonzalez-Dugo, V., Landa, B.B., Boscia, D., Saponari, M., Navas-Cortes, J.A. Anticipating and understanding new *Xylella fastidiosa* epidemics across European landscapes; insights from remote sensing and network analysis. International Congress of Plant Pathology (ICPP) 2018: Plant Health in A Global Economy, 29th July – 3rd August 2018, Boston, MA, USA.
- 2018. **Hornero, A.**, Hernández-Clemente, R., Beck, P.S.A., Navas-Cortés, J.A., Zarco-Tejada, P.J. Using Sentinel-2 imagery to track changes produced by *Xylella fastidiosa* in olive trees. International Geoscience and Remote Sensing Symposium, IGARSS 2018. DOI: 10.1109/IGARSS.2018.8517697. 24-27th July 2018, Valencia, Spain.
- 2018. Hernández-Clemente, R., North, P.R.J., **Hornero, A.**, Zarco-Tejada, P.J. Monitoring forest health with sun-induced chlorophyll fluorescence observations and 3-D radiative transfer modeling. International Geoscience and Remote Sensing Symposium, IGARSS 2018. DOI: 10.1109/IGARSS.2018.8519389. 24-27th July 2018, Valencia, Spain.
- 2017. Zarco-Tejada, P.J., Calderón Madrid, R., Beck, P.S.A., González-Dugo, V., Montes Borrego, M., **Hornero, A.**, Landa, B.B., Boscia, D., Susca, L., Navas Cortés, J.A., 2017. Detecting *Xylella fastidiosa* with hyperspectral remote sensing: findings from two years of airborne campaigns in Puglia. European conference on *Xylella fastidiosa*: finding answers to a global problem, 13th-15th November 2017, Palma de Mallorca, Spain.
- 2017. Zarco-Tejada, P.J., Calderon-Madrid, R., González-Dugo, V., Montes-Borrego, M., **Hornero, A.**, Landa, B.B., Boscia, D., Saponari, M., Beck, P.S.A., Navas-Cortes, J.A., Detecting X.f. using airborne hyperspectral remote sensing: findings from Puglia and Mallorca campaigns. European conference on *Xylella fastidiosa*: finding answers to a global problem, 13th-15th November 2017, Palma de Mallorca, Spain.

- 2017. Hernández-Clemente, R., North, P.R.J., **Hornero, A.**, and Zarco-Tejada, P.J., Assessing potential of sun-induced chlorophyll fluorescence for early detection of forest decline using a 3-D radiative transfer model accounting for forest structure. 5th International Symposium on Recent Advances in Quantitative Remote Sensing: RAQRS'V, 18th-22nd September 2017, Valencia, Spain.
- 2017. Hernández-Clemente, R., North, P.R.J., **Hornero, A.**, Zarco-Tejada, P.J., Assessing potential of sun-induced chlorophyll fluorescence for early detection of forest decline using a 3-D radiative transfer model accounting for forest structure. FLEX 2017, "Remote sensing of fluorescence, photosynthesis and vegetation status". 17th-19th January 2017, ESA-ESRIN, Frascati, Italy.
- 2016. Monterroso, A., **Hornero, A.**, Yuste, R., Zarco-Tejada, P.J., Teledetección aérea e "smart archaeology" per la città romana di Mellaria (AltoGuadiato-Córdoba-Spagna). 2° Convegno Internazionale di Archeologia Aerea. 3rd-6th February 2016, Università del Salento, Italy.
- 2014. Cairns, J., Tattaris, M., Zaman-Allah, M.A., Zarco-Tejada, P.J., Araus, J.L., Mtimamba, C., **Hornero, A.**, Ndlela, T., Reynolds, P.M., Developing Improved Wheat and Maize Varieties for Future Climates Using Remote Sensing at CIMMYT. V Sustainable Irrigation and Drainage Conferences. 3rd November, Hyatt Regency Long Beach, Regency Ballroom D, CA, USA.
- 2014. Araus, J.L., Vergara, O., Elazab, A., Zarco-Tejada, P.J., **Hornero, A.**, Prasanna, B.M., Zaman-Allah, M.A., Mtimamba, C., Cairns, J., High Throughput and Precision Phenotyping for Improving Abiotic Stress Resilience in Maize. 12th Asian Maize Conference and Expert Consultation on Maize for Food, Feed, Nutrition and Environmental Security. 30th October – 1st November 2014, Bangkok, Thailand.

MEDIA COVERAGE

- 29/11/2019 *Xylella Fastidiosa – Plan de actuación: Evaluación del impacto de Xylella fastidiosa en los olivos de Apulia mediante datos satelitales y fotografías aéreas*
- 28/01/2017 Programa TESIS Canal Sur: Patrimonio Inteligente [timestamp 10:55]
- 04/06/2014 Fundación Descubre: Desarrollan un sistema de control de suelos de terrazas agrícolas basado en vehículos aéreos
- 12/07/2013 CIMMYT Informa (Spanish version): Research battles wheat spot blotch disease
- 11/04/2013 UB Press release: 'Skywalker': aeronautical technology to improve maize yields
- 01/03/2013 CIMMYT Informa: Con el "Sky Walker" se logran avances en el fenotipado en el sur de África
- 01/05/2009 Revista AET, nº30: El Laboratorio QuantaLab del IAS-CSIC

NON-ACADEMIC PUBLICATIONS

- Installation and configuration of Compiz Fusion. Linux+ Magazine Nº 38. December 2007. ISSN: 1732-7121
- Improving Ubuntu Linux 7.10. Linux+ Magazine Nº 1 (SE). January 2008. ISSN: 1733-2079
- C programming language GNU/Linux. Linux+ Magazine Nº 40. February 2008. ISSN: 1732-7121
- Improving GNU/Linux, tricks and enhancements I. Linux+ Magazine Nº 40. February 2008. ISSN: 1732-7121
- Improving GNU/Linux, tricks and enhancements II. Linux+ Magazine Nº 41. March 2008. ISSN: 1732-7121
- Improving GNU/Linux, tricks and enhancements III. Linux+ Magazine Nº 42. April 2008. ISSN: 1732-7121

PARTICIPATION IN R&D AND INNOVATION PROJECTS

SORTED BY STARTING DATE ~ ONGOING PROJECTS ARE MARKED IN BOLD

- **01/01/2018 – 31/12/2020 [STEREO in action Programme]**
INTELLI-FRUIT: Intelligent Fruit Cultivation. Contract #SR/00/370
PI: Dr. Stephanie Delalieux

- **01/10/2017 – 31/10/2020 [Spanish National Plan Project]**
ESPECTRAMED: Spatial patterns of photosynthetic efficiency and water balance for the preview evaluation of Mediterranean pine and oak forests from hyperspectral data. #CGL2017-86161-R
PI: Dr. José Luis Quero Pérez
- **01/11/2016 – 31/10/2020 [H2020 Project]**
XF-ACTORS: Xylella Fastidiosa Active Containment Through a multidisciplinary-Oriented Research Strategy. Grant #727987
PI: Dr. Blanca B. Landa del Castillo
- 01/01/2016 – 31/12/2017 [Spanish National Plan Project]
Development of the hyperspectral image processing chain using airborne micro- and nano-sensors. #201640E003
PI: Dr. Luca Testi
- 01/11/2015 – 31/10/2019 [H2020 Project]
POnTE: Pest Organisms Threatening Europe. Grant #635646
PI: Dr. Blanca B. Landa del Castillo
- 16/10/2015 – 31/10/2017 [R&D Collaboration Agreement]
Monitoring the physiological state of the turf in sports areas using hyperspectral and thermal sensors and RGB/CIR sensors installed in drones
Company: Royalverd Service, S.L.
- 01/01/2015 – 31/12/2016 [FP7 Project]
FluorFLIGHT: A new integrated canopy fluorescence model-based for remote sensing of forest health and productivity. Grant #628039
PI: Dr. Rocío Hernández Clemente
- 16/05/2014 – 16/02/2019 [Spanish National Plan Project]
New tools for improving wheat adaptation in Andalusia. #P12-AGR-0482
PI: Dr. Pilar Hernández Molina
- **10/03/2014 – 10/03/2024 [Technological Support Contract]**
Intellectual property, Collaboration and Knowledge Transfer: Hyperspectral and Thermal Remote Sensing methodologies for calibration, data acquisition and processing
Company: ZNiR Sensing Solutions, S.L.
- 01/01/2014 – 30/11/2017 [Spanish National Plan Project]
QUERCUSAT: Early detection of *Quercus ilex* decay processes from the integration of hyperspectral and ecophysiological data. #CGL2013-40790-R
PI: Dr. José Luis Quero Pérez
- 01/12/2013 – 30/11/2018 [RyC Grant]
Hyperspectral and thermal remote sensing methodologies for detecting changes in the terrain within the framework of archaeological surveys. Ref. #RYC-2012-11035
PI: Antonio Monterroso Checa
- 08/05/2013 – 16/04/2017 [R&D Collaboration Agreement]
Development of physiological indicators related to water stress using airborne. #080109140022
Companies: BASF SE & BAYER AG
- 01/01/2013 – 31/12/2015 [Spanish National Plan Project]
Methods of estimation of chlorophyll fluorescence in olive, orange trees and vineyard from hyperspectral microsenors on UAVs. #AGL2012-40053-CO3-01
PI: Prof. Pablo J. Zarco-Tejada
- 04/12/2012 – 01/08/2014 [R&D Collaboration Agreement]
Engineering and spectral remote sensing for environmental qualification and modernisation. #080109130001
Company: ZUMAIN Ingenieros, S.L.
- 01/10/2012 – 30/09/2014 [FP7 Project]
THERMOLiDAR: A new tool for sustainable forest management based on LiDAR (Laser Imaging Detection And Ranging) and THERMAL data integration. Grant #315165
PI: Prof. Rafael M. Navarro Cerrillo.

- **09/05/2012 – 09/05/2022 [Technological Support Contract]**
Intellectual property, Collaboration and Knowledge Transfer: Microhyperspectral camera calibrations
Company: Álava Ingenieros, S.A.
- **17/01/2012 – 31/12/2019 [R&D Collaboration Agreement]**
Development of a Thermal and Multispectral Remote Sensing system in manned aircraft for crop monitoring
Company: Bioiberica, S.A.U.
- **01/01/2012 – 31/12/2016 [CIMMYT Competitive Grants Initiative]**
HTPPs: Affordable field-based high Throughput Phenotyping Platforms
MAIZE Strategic Initiative 9 – New tools and methods for NARS and SMEs
PI: Prof. José Luis Araus Ortega
- **01/01/2012 – 31/03/2014 [FP7 Project]**
FieldCopter: GPS-EGNOS based Precision Agriculture using Unmanned Aerial Vehicles. Grant #277616
PI: Dr. Paul van der Voet
- **04/05/2011 – 31/12/2014 [Spanish National Plan Project]**
INNFACTO: Commercial-level development of a tool to efficiently manage irrigation scheduling in plots based on high-resolution thermal images. #IPT-2011-1786-060000
PI: Prof. Pablo J. Zarco-Tejada
- **31/01/2011 – 31/01/2018 [R&D Collaboration Agreement]**
Use of lightweight unmanned platforms with thermal, multispectral and hyperspectral sensing for crop monitoring
Company: ELIMCO AEROSPACE S.L.U.
- **01/01/2011 – 30/06/2012 [EU DG ENVIRONMENT Institutional agreement]**
REDSIM: Remote sensing-based DSS for Sustainable drought-adapted Irrigation Management.
#2010/581763/SUB/D1
PI: Prof. Pablo J. Zarco-Tejada
- **01/01/2010 – 31/12/2012 [Spanish National Plan Project]**
Hyperspectral and Thermal Remote Sensing for stress detection and monitoring of physiological parameters in vineyard and olive. #AGL2009-13105-C03-01
PI: Prof. Pablo J. Zarco-Tejada
- **26/10/2009 – 25/04/2010 [Technological Support Contract]**
Thermal and hyperspectral imaging of the peatland area in the “Tablas de Daimiel” Spanish National Park
Company: AURENSIS, S.L.U.
- **21/04/2009 – 20/04/2010 [RS Science for Carbon and Climate]**
NASA spectral bioindicators of ecosystem photosynthetic efficiency. #NNH05ZDA001N Ext.
PI: Prof. Elizabeth Middleton

TEACHING

TEACHING BLOCK 2 2018/2019	Data Analysis (GEG259) UNDERGRADUATE COURSE (8 HOURS) Department of Geography, Swansea University. Swansea, UK
TEACHING BLOCK 2 2018/2019	Environmental Research Methods (GEG264B) UNDERGRADUATE COURSE (10 HOURS) Department of Geography, Swansea University. Swansea, UK
TEACHING BLOCK 1 2018/2019	The Earth from Space: Monitoring Global Environmental Change (GEG236) UNDERGRADUATE COURSE (23 HOURS) Department of Geography, Swansea University. Swansea, UK
MAY 2018	Applications of Geographic Information Systems for species management

	POSTGRADUATE COURSE (5 HOURS) CITES' master program, International University of Andalusia. Baeza, Spain
APRIL 2017	Application of UAV Data in Temperate and Arctic Environmental Research POSTGRADUATE COURSE (4 HOURS) Department of Geoscience, University of Copenhagen. Copenhagen, Denmark
JULY 2013	Remote Sensing using unmanned vehicles for phenotyping applications in crop genetic improvement INTERNATIONAL COURSE (6 HOURS) Instituto Nacional de Innovación Agraria. Chiclayo, Peru
APRIL 2013	Real Time Systems POSTGRADUATE COURSE (120 HOURS) Universidad de Córdoba, Departamento de Ingeniería Forestal. Córdoba, Spain
FEBRUARY 2013	Recent advances in phenotyping POSTGRADUATE COURSE (4 HOURS) Crop Breeding Institute. Harare, Zimbabwe
MAY 2013	Remote Sensing applied to the monitoring of crops and natural vegetation for the detection of water and nutritional stress POSTGRADUATE COURSE (8 HOURS) Universidad Politécnica de Madrid, ETS Ingenieros Agrónomos. Madrid, Spain
JUNE 2005 – SEPTEMBER 2007	Programming in C and Advanced Programming in C++ UNDERGRADUATE COURSES (240 HOURS) Espaudit Formación. Córdoba, Spain

PROGRAMMING SKILLS

EXPERT AND ADVANCED LEVEL; CATEGORISED BY PURPOSE

- Data and Image Processing: **C**, **C++**, **IDL** and **Java**
- Data, Statistical and Geospatial Analysis: **R** and **Python**
- Rich Desktop Application: **JavaFX**, **GTK** and **Swing**
- Web Services: **PHP** and **JavaScript**
- DBMS: **MySQL** and **PostgreSQL**

LANGUAGES

- Spanish. Mother tongue
- English. Advanced level
- French. Breakthrough level