

PERSONAL DATA

<https://monicaherrerohuerta.webnode.com/>

E-mail: monicaherrero@usal.es; ORCID ID: 0000-0002-4134-557X

KEYWORDS: Plant Science, Remote sensing, Photogrammetry, Artificial Intelligence, LiDAR

EDUCATION

University of Salamanca (Salamanca, SP)

- International PhD in Cartographic Geotechnologies applied to Engineering and Energy. QUM LAUDE September 2016
'Low-cost Photogrammetry applied to Agro-forestry Engineering'
- Master of science in Cartographic Geotechnologies applied to Engineering and Architecture June 2013
- Project of Civil Engineering. QUM LAUDE March 2006
'Modeling a Pisuerga aquifer. Flow and management models (software development)'
- Bachelor of science in Civil Engineering (Hydrology) May 2005

University Pompeu Fabra (Barcelona, SP)

- Master of Education in Mathematics and Statistics Education June 2011

University Alfonso X (Madrid, SP)

- Master in Civil Engineering June 2007
- Project of Civil Engineering October 2007
'3D Image Modeling of the Seberetxe tunnel (Bilbao, SP)'

PUBLICATIONS & SOFTWARE (H index=11) (SCI papers Q1 as first author/SCI papers Q1=12/14)

Published

- Hernanz-Gilbert, C., Cabo, C., Moreno-Martínez, Á., & Herrero-Huerta, M. (2026). Exploring the Potential of the MandEye Handheld LiDAR System for Mediterranean Understorey Characterisation. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 49, 413-419.
- Herrero-Huerta, M., Pirotti, F., Hernanz-Gilbert, C., & Sanchez-Lopez, N. (2026). A Systematic Review of UAS-based Remote Sensing for Ecosystem-based Disaster Risk Reduction: Applications, Policy Interfaces and Opportunities. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*.
- Andrés-Anaya, P.; Molada-Tebar, A.; Hernández-López, D.; Moreno, M.Á.; González-Aguilera, D.; Herrero-Huerta, M. 'Radiometric Improvement of Spectral Indices Using Multispectral Lightweight Sensors Onboard UAVs'. *Drones* 2024, 8, 36. <https://doi.org/10.3390/drones8020036>
- Herrero-Huerta, M., et al. (2023) 'Tree-level Fuel Connectivity to assess Crown Wildfire Potential by UAS-based Photogrammetry'. In *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (Egypt)*. <https://doi.org/10.5194/isprs-archives-XLVIII-1-W2-2023-1743-2023>
- Herrero-Huerta, M., Gonzalez-Aguilera, D., & Yang, Y. (2023). 'Structural Component Phenotypic Traits from Individual Maize Skeletonization by UAS-Based Structure-from-Motion Photogrammetry'. *Drones*, 7(2), 108. DOI: 10.3390/drones7020108.
- Herrero-Huerta, M., Raunonen, P., and Gonzalez-Aguilera, D. (2022). '4DRoot: Root phenotyping software for temporal 3D scans by X-ray computed tomography'. *Frontiers in Plant Science*, 13. DOI: 10.3389/fpls.2022.986856.
- Herrero-Huerta, M., Tardy, H., Morcillo-Sanz, A., Gonzalez-Gonzalez, E. and Gonzalez-Aguilera, D. (2022). 'Grape Bunch Architecture by Low-Cost 3D Scanner'. 2022 *Frutic*, 14th International Symposium.
- Herrero-Huerta, M., Meline, V., Iyer-Pascuzzi, A.S. et al. (2021). '4D Structural root architecture modeling from digital twins by X-Ray Computed Tomography'. *Plant Methods* 17, 123 (2021). DOI: 10.1186/s13007-021-00819-1.
- Herrero-Huerta, M., Tolley, S., Tuinstra, M. R., and Yang, Y. (2021). 'Individual maize extraction from UAS imagery-based point clouds by 3D deep learning'. In *Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping VI* (Vol. 11747, p. 1174704). International Society for Optics and Photonics.
- Herrero-Huerta, M., Meline, V., Iyer-Pascuzzi, A. S., Souza, A. M., Tuinstra, M. R., and Yang, Y. (2021). 'Root phenotyping from X-ray Computed Tomography: skeleton extraction'. *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLIII-B4-2021, 417–422. DOI: 10.5194/isprs-archives-XLIII-B4-2021-417-2021, 2021
- Herrero-Huerta, M., Bucksch, A., Puttonen, E. and Rainey, K. M. (2020) 'Canopy roughness: a new phenotypic trait to estimate above-ground biomass from unmanned aerial system'. *Plant Phenomics*. DOI: 10.34133/2020/6735967
- Herrero-Huerta, M., Rodriguez-Gonzalez, P. and Rainey, K.M. (2020) 'Yield prediction by machine learning from UAS-based multi-sensor data fusion in soybean'. *Plant Methods* 16, 78. DOI: 10.1186/s13007-020-00620-6
- Herrero-Huerta, M., Rahmani, S. R., and Rainey, K. M. (2020) 'Deep phenotyping considering tile drainage from UAS-based multispectral imagery by convolutional neural networks'. *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLIII-B3-2020, 417–421. DOI: 10.5194/isprs-archives-XLIII-B3-2020-417-2020
- Sanchez-Aparicio, L.J., Herrero-Huerta, M., Esposito, R., Schipper, R. and González-Aguilera, D. (2019) 'Photogrammetric Solution for Analysis of Out-Of-Plane Movements of a Masonry Structure in a Large-Scale Laboratory Experiment'. *Remote Sens.*, 11(16), 1871. DOI: 10.3390/rs11161871
- Herrero-Huerta, M., Lagüela, S., Alfieri, S. M. and Menenti, M. (2019) 'Generating high-temporal and spatial resolution TIR data'. *International Journal of Applied Earth Observation and Geoinformation*. DOI: 10.1016/j.jag.2019.01.016
- Herrero-Huerta, M. and K. M. Rainey. 'High Throughput Phenotyping of Physiological Growth Dynamics from UAS-Based 3D Modeling in Soybean'. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* 4213 (2019): 357-361. DOI: 10.5194/isprs-archives-XLII-2-W13-357-2019

- **Herrero-Huerta, M.**, Govindarajan, S., Cherkauet, K. and Rainey, K. (2019) 'Triple S: A new tool for Soybean High Throughput Phenotyping from UAS-based Multispectral Imagery'. *Proc. SPIE 11007, Advanced Environmental, Chemical, and Biological Sensing Technologies XV*, 110070K. DOI: 10.1117/12.2519376
- **Herrero-Huerta, M.**, Rodriguez-Gonzalez, P. and Lindenbergh, R. (2018) 'Automatic Tree Parameter Extraction by Mobile Lidar System in an Urban Context'. *Plos One*. DOI: 10.1371/journal.pone.0196004
- **Herrero-Huerta, M.**, Lindenbergh, R. and Gard, W. (2018) 'Leaf Movements of indoor plants monitored by Terrestrial LiDAR'. *Frontiers in Plant Science*, 9, 189. DOI: 10.3389/fpls.2018.00189
- Govindarajan, S., **Herrero-Huerta, M.** and Rainey, K.M. (2018) 'Extraction of Soybean Edges from UAS-based Multispectral Imagery'. In *Annals of The Second International Conference of ICT for Adapting Agriculture to Climate Change (Colombia)*
- **Herrero-Huerta, M.**, Lagüela, S., Alfieri, S. M., and Menenti, M. (2017) 'Generating high-temporal and spatial resolution TIR image data'. *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLII-2/W7, 737-741, DOI: 10.5194/isprs-archives-XLII-2-W7-737-2017
- **Herrero-Huerta, M.** and Lindenbergh, R., Posien, L. and Van Damme, M. (2016) 'Morphological Changes along a Dike Landside Slope by 4-D High Resolution Terrestrial Laser Scanning' In *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, WGIII/2 (Czech Republic)*
- Van Damme, M., Posien, L. and **Herrero-Huerta, M.** (2016) 'Comparing overflow and wave-overtopping induced breach initiation mechanisms in an embankment breach experiment'. In *Annals of the 3rd European Conference on Flood Risk Management (France)*
- Shen, Y., Huang, T., Guo, X., Zang, Q. and **Herrero-Huerta, M.** (2016) 'An inversion method of Atmospheric Refraction Coefficient based on Trigonometric Leveling Network'. *Journal of Surveying Engineering*. DOI: 10.1061/(ASCE) SU.1943-5428.0000199
- **Herrero-Huerta, M.**, Felipe-García, B., Belmar-Lizarán, S., Hernández-López, D., Rodríguez-González, P. and González-Aguilera, D. (2016) 'Dense Canopy Height Model from a low-cost photogrammetric platform and LiDAR data'. *Trees*, 1-15
- Lindenbergh, R. C., Berthold, D., Sirmacek, B., **Herrero-Huerta, M.**, Wang, J. and Ebersbach, D. (2015) 'Automated large-scale parameter extraction of road-side trees sampled by a laser mobile mapping system'. In *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XL-3/W3 (France)*
- **Herrero-Huerta, M.** and Lindenbergh, R. C. (2015) 'Automatic Tree Breast Height Diameter Estimation from Laser Mobile Mapping Data in an Urban Context'. In *Proceedings of Silvilaaser (France)*
- **Herrero-Huerta, M.**, González-Aguilera, D., Rodriguez-Gonzalez, P. and Hernández-López, D. (2015). 'Vineyard yield estimation by automatic 3D bunch modelling in field conditions'. *Computers and electronics in agriculture*, 110, 17-26
- **Herrero-Huerta, M.**, Hernández-López, D., Rodriguez-Gonzalez, P., González-Aguilera, D. and González-Piqueras, J. (2014). 'Vicarious radiometric calibration of a multispectral sensor from an aerial trike applied to precision agriculture'. *Computers and Electronics in Agriculture*, 108, 28-38

Software & Registered Intellectual Property

- 'TiF (Trees in Forest: individual tree trait extraction from forest point cloud)' (2023). *R code*
- '4DRoot (Root phenotyping software for temporal 3D scans by X-ray computed tomography)' (2022). *Matlab code*
- 'Triple S (Statistical computing of Segmented Soybean visible and multispectral imagery)' (2018). *Python code*
- 'ATPE (Automatic Tree Parameter Extraction by laser mobile mapping system)' (2016). *C++ code*
- 'MULRACS (MULTispectral RAdiometric Calibration of different sensors)' (2015). *GNU Octave code*

RESEARCH EXPERIENCE

Spanish National Research Council (CSIC) (ES)

January 2025 – Never-ending

Position: Excellence researcher (RyC-Max). Department of Ecology. Desertification Research Centre (CIDE) (ES)

I+D Projects

- **Principal Investigator:** 'Transcontinental Collaboration for Sustainable Irrigation: Spain-China (Water Efficiency Initiative)'. Grant number: BICHN25011. Funded: 23,747.60 EUR. Bilateral Mobility Actions. Chinese Academy of Sciences (CH). Spanish National Research Council (ES). Desertification Research Centre (ES). 2026-2027
- **Principal Investigator:** 'Advancing Climate Resilience through 5D Modelling of Mediterranean Forest Ecosystems for Flood Risk Reduction (ECO-TWIN)'. Grant number: PID2024-163036OA-I00. Funded: 170 k EUR. Spanish Research Agency "Knowledge Generation Projects" (ES). 2025-2028
- **Principal Investigator:** 'FRES-5D: Strengthening Forest Ecosystem Resilience to Extreme Climate Events through 5D Modelling'. Grant number: 20253MAX003. Funded: 300 k EUR. Spanish National Research Council (CSIC, ES). Desertification Research Centre (CIDE, ES). 2025-2027

Research activities

- Member of Network of **Specialists in Desertification**. Ministry for Ecological Transition and the Demographic Challenge (ES). Since April 2026.
- Member of **RUVID** (Valencian Universities Network for the Promotion of R&D&I). Initiative: R&D&I Strategy for Security and Emergencies / Group: Post-Emergency Recovery. Since November 2025.
- Accreditation **Researcher R3**
- **Expert evaluator** for the Spanish State Research Agency (AEI): RyC 2025, Knowledge Generation Projects 2025.
- **Associated R&D&I member**. Unit Name (University of Castilla-La Mancha & Desertification Research Centre): Remote Sensing, Agronomy and Irrigation
- **EcoNET lab** (Digital Solutions for Ecosystems, moving Climate Resilience Forward) **leader**. Desertification Research Centre (CIDE) (ES)
- **Oral presentation:** 'UAS (Unoccupied Aerial Systems) for Eco-DRR (Ecosystem-based Disaster Risk Reduction)'. Final Meeting of Three-dimensional Forest Ecosystem Monitoring and Better Understanding by Terrestrial-based Technologies (3DForeEcoTech). COST Action funded by the European Union. Warsaw (PL). July, 2024.
- **Hackathon team member** on improving crop growth models by the inclusion of remote sensing. Pan-European Network of Green Deal Agriculture and Forestry Earth Observation Science (PANGEOS). COST Action funded by the European Union. Aarhus University (DK). August 2025.

- **Guest editor** of the Special Issue: Advances in UAS Applications for DRR (Disaster Risk Reduction) and Ecosystem Dynamics. Ecological Indicators (Elsevier editorial)

International Congresses

- International Society for Photogrammetry and Remote Sensing. **Oral presentation:** 'Exploring the Potential of the Mandeye Handheld LiDAR System for Mediterranean Ecosystem Characterisation'. International Workshop: 'Towards Smart Forests'. Toronto (Canada). July, 2026
- ForestSAT: Association for Forest Spatial Analysis Technologies. **Oral presentation.** 'Integrating UAV LiDAR and Multispectral Data for Improved Classification to Flood Hazard Assessment in Mediterranean Forests'. Geospatial Innovations I. Gainesville (FL, USA). May, 2026
- SILVILASER. **Poster presentation:** '4D Detailed Forest Mapping by UAS to Disaster Risk Reduction'. Quebec (CA). Sep, 2025

Teaching oriented

- **Co-director** and **promotor** of 2 PhD in Remote Sensing. University of Valencia (ES). Collaboration with Image and Signal Processing group (ISP) from the University of Valencia (ES). 2025-2028
- **Associated mentor** in environmental data science. Environmental Data Science Innovation and Inclusion Lab (ESIIL), CIRES (Cooperative Institute for Research in Environmental Sciences), University of Colorado Boulder (CO, USA)
- **Mentor support team.** Momentum program (Spanish National Research Council) to Advance Digital Skills. 2025-2028

Additional training

- *Machine Learning for Scientific Research: Classification and Regression Trees, Random Forest and Boosting techniques, and Deep Learning with KERAS.* Society of Friends of the National Museum of Natural Sciences (ES). 2025 (120 h)

University of Padova (IT)

June 2024 – December 2024

Position: Scientific researcher. CIRGEO (Interdepartmental Research Center of Geomatics). Department of Land, Environment and Agro-Forestry. University of Padova (IT)

I+D Projects

- **Scientific Researcher:** 'Definizione di mappe di distribuzione di specie forestali in contesti futuri scenari di cambiamento climatico', Grant number: CUP C23B24000000007. D.R.E.AM Italia. University of Padova (IT). 2024-2025
- **Co-Principal Investigator:** 'From Forests to 3D Digital Models: training new generations on 3D geodata surveying and analysis (3DForTrain)'. The International Society for Photogrammetry and Remote Sensing Education and Capacity Building Initiative. Total funded: 10 k CHF. 2024
- **Principal Investigator:** 'SIMFOREST: Digital Twin to simulate Forest Dynamics due to disturbances driven by Climate Change (Fires, Invasive Plants and Diseases)'. Provincial Council of Ávila (ES). Funded: 10 k. 2024

Research activities

- **Virtual Mobility** at Institute of Plant Sciences & Genetics in Agriculture (The Hebrew University of Jerusalem, ISRL) 'Review for hyperspectral time-series analysis of crop traits'. Pan-European Network of Green Deal Agriculture and Forestry Earth Observation Science, COST Action funded by the European Union. August 2024
- **Scientific committee member** of 'The Geospatial Week of the International Society for Photogrammetry and Remote Sensing'. International Workshop on Laser Scanning. Dubai (United Arab Emirates). 2025
- **Scientific organizing committee** member of the workshop '9th Computer Vision Problems in Plant Phenotyping and Agriculture' (CVPPA) within the European Conference on Computer Vision (ECCV). Milano (IT). Sep 29-Oct 4th, 2024
- **Scientific committee member** of 'Beyond the canopy: technologies and applications of remote sensing'. International Society for Photogrammetry and Remote Sensing, TCIII. International Workshop on Smart Forest. Belem (Brazil). 2024

University of Salamanca (ES)

January 2022 – December 2023

Position: Distinguished researcher (Maria Zambrano contract). Department of Cartographic and Land Engineering. University of Salamanca (ES). Next generation EU. Requalification of the Spanish university system for 2021-2023

I+D Projects

- **Co-Principal Investigator:** 'XTRACT: A Sustainable Ecosystem for the Innovative Resource Recovery and Complex Ore Extraction'. Grant number: 101138432. Total funded: 450 k EUR/ USAL: 22 k EUR. Horizon Europe Framework Programme (HORIZON). University of Salamanca (ES). 2023-2026
- **Principal Investigator:** 'ASELID: Augmented reality to Social and Emotional Learning for people with Intellectual Disability'. Total funded: 166.1 k EUR/ USAL: 98.4 k EUR. Recovery, Transformation and Resilience Plan (Next Generation EU). University of Salamanca (ES). 2023
- **Project Manager:** 'CHAMELEON: a holistic approach to sustainable, digital EU Agriculture, Forestry, Livestock and Rural Development based on Reconfigurable Aerial Enablers and edge Artificial Intelligence-on-Demand Systems'. Grant number: 101060529. Total funded: 6 M EUR / USAL: 1.1 M EUR. European Union's Horizon 2020. University of Salamanca (ES). 2022- 2023
- **Scientific Researcher:** 'TREEADS: A holistic Fire Management Ecosystem for Prevention, Detection and Restoration of Environmental Disasters'. Grant number: 101036926. Total funded: 22.9 k EUR / USAL: 0.8 k EUR. European Union's Horizon 2020. University of Salamanca (ES). 2022- 2023

International Congresses

- Geospatial Week of the International Society for Photogrammetry and Remote Sensing. **Oral presentation:** 'Tree-level fuel connectivity to assess crown wildfire potential by UAS-based photogrammetry'. International Workshop on Smart Forest. Cairo (EGY). Sep, 2023
- 14th International FRUTIC Symposium. **Oral presentation:** 'Grape Bunch Architecture by Low-Cost 3D Scanner'. Valencia (ES). June, 2022
- 7th International Plant Phenotyping Symposium 2022. **Poster presentation:** 'A low-cost gaming sensor-based phenotyping pipeline for greenhouse system production'. Wageningen (NL). September, 2022
- 2022 North American Plant Phenotyping Network Annual Conference. **Oral presentation** (Fast-Forward): 'Corn skeleton reconstruction by UAS-based Structure from Motion'. Virtual presence. February, 2022

Research activities

- **Short Term Scientific Mission** at Computational & Applied Vegetation Ecology lab (Ghent University, BE) '*Digital Forest by 3D Point Clouds plus RADAR info*'. Three-dimensional Forest Ecosystem Monitoring and Better Understanding by Terrestrial-based Technologies, COST Action funded by the European Union. June 2023
- **Scientific organizing committee** member of the workshop '8th Computer Vision Problems in Plant Phenotyping and Agriculture' (CVPPA) within the International Conference of Computer Vision (ICCP). Paris (FR). October 2-6th, 2023.
- **Topic editor**: Unmanned Ground and Aerial Vehicles (UGVs-UAVs) for Digital Farming (Participating Journals: Agriculture, Applied Sciences, Drones, Remote Sensing & Sensors (MDPI editorial))
- 4th International Conference on Plant Science and Agriculture. **Invited speaker**: '*4DRoot: a root phenotyping software for temporal 3D scans by X-Ray Computed Tomography*'. Webinar. March, 2022

Teaching oriented

- **Instructor**: '*3D data capture and processing*'. Degree in Engineering in Geoinformation and Geomatics. Department of Cartographic and Land Engineering. University of Salamanca (ES). 2023-2024 (3 ETS = 30 h)
- **Master thesis tribunal** in Cartographic Geotechnologies in Engineering and Architecture. Department of Cartographic and Land Engineering. University of Salamanca (ES). 2022-2023 second announcement
- **PhD thesis tribunal** '*Remote Sensing assessment of land use and crop parameters in irrigated systems*'. Universidad Politecnica de Madrid, CEIGRAM, Madrid (ES). July 2023
- Participation in the 8th International Conference on **Higher Education Teaching** (CINDU 2023). Online. June, 2023.
- **Instructor**: '*Drones and their geomatic applications*'. Degree in Engineering in Geoinformation and Geomatics. Department of Cartographic and Land Engineering. University of Salamanca (ES). 2022-2023 (3 ETS = 30 h)
- **Degree thesis supervised**: '*Design project of the spillway in the San Martin river from Aviles (ES)*'. University of Salamanca (ES). 2022-2023 (9 m)
- **Instructor**: '*Cameras*'. Master's Degree in Cartographic Geotechnologies in Engineering and Architecture. Department of Cartographic and Land Engineering. University of Salamanca (ES). 2022-2023 & 2023-2024 (1.5 ETS = 15 h)
- **Instructor**: '*Laser and Radar*'. Master's Degree in Cartographic Geotechnologies in Engineering and Architecture. Department of Cartographic and Land Engineering. University of Salamanca (ES). 2022-2023 & 2023-2024 (1.5 ETS = 15 h)
- **Instructor**: '*Environmental Engineering*'. Degree in Civil Engineering. Department of Cartographic and Land Engineering. University of Salamanca (ES). 2022-2023 (1.5 ETS = 15 h)
- **Instructor**: '*Remote sensing for vineyard monitoring*'. Master's Degree in Oenology and its adaptation to Climate Change. University of Salamanca (ES). 2021-2022 (1 ETS = 10 h) and 2022-2023 (1 ETS = 10 h)

Additional training

- *Generative artificial intelligence for creating applications*. University of Salamanca (ES). 2023 (210 h)

Purdue University (IN, USA)

January 2018 – December 2021

Position: Research Associate. The Institute for Plant Science, College of Agriculture. Purdue University (IN, USA). 2020-2021

Research Associate. Department of Agriculture. Purdue University (IN, USA). 2018-2020

I+D Projects

- **Project co-leader**: '*Innovations in Proximal Sensing data processing pipelines to Crop Phenotyping*'. Total funded: \$45 k by Bayer AG. The Institute for Plant Science, College of Agriculture. Purdue University (IN, USA). 2020-2021
- **Co-Principal Investigator**: '*Machine learning-based digital innovations for in-field corn phenotyping using aerial image-based point clouds: 'PhenoDrone' tool*'. Total funded: \$75 k. The Corn Phenotyping Endowment Research Grant sponsored by the Indiana Corn Marketing Council and Agricultural Research and Graduate Education at Purdue University (USA). 2021
- **Co-Principal Investigator**: '*Collaborating with a Purdue start-up to improve phenotyping accuracy for canopy architecture from UAS imagery using ploy-by-plot 3D modeling*'. Total funded: \$50 k. 2019 AgSEED. Agricultural Research and Extension Leading to Economic Development in Indiana Agriculture and Rural Communities. 2020
- **Research Associate**: '*Pipelines in Close and Proximal Sensing to Plant Phenotyping*'. The Institute for Plant Science, College of Agriculture. Purdue University (IN, USA). 2020-2021
- **Research Associate**: '*Development of Analytical Tools for Drone-based Canopy Phenotyping in Crop Breeding (grant number: 17000419; WBSE: F.00068834.02.005)*'. National Institute of Food and Agriculture; U.S. Department of Agriculture. Total funded: 410 k EUR. Department of Agriculture. Purdue University (IN, USA). 2018-2020

International Congresses

- XXIV International Society for Photogrammetry and Remote Sensing Congress. **Interactive Poster Presentation**: '*Root phenotyping by X-Ray Computed Tomography*'. International Workshop on Digital Twins. Digital Edition. July, 2021
- 2021 North American Plant Phenotyping Network Annual Conference. **Oral presentation** (Genomes to Fields Workshop) & Poster presentation: '*Structural Root Modeling from digital twins by X-Ray Computed Tomography*'. Virtual event. February, 2021
- SPIE. Defense + commercial sensing. **Oral presentation**: '*Individual maize extraction from UAS imagery-based point clouds by 3D deep learning*'. Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping VI. Virtual event. April, 2020
- Geospatial Week of the International Society for Photogrammetry and Remote Sensing. **Oral presentation**: '*Deep phenotyping by UAS-based Multispectral Imagery*'. International Workshop on Precision Farming. Virtual Conference. August, 2020
- Phenome 2020. **Oral presentation**: '*Biomass estimation from UAS Point Cloud-based Structure from Motion (SfM) in Soybean*'. Tucson (AR, USA). February, 2020
- Geospatial Week of the International Society for Photogrammetry and Remote Sensing. **Oral presentation**: '*High throughput phenotyping from UAS-based 3D modeling*'. International Workshop on Unmanned Aerial Vehicles in Geomatics. Twente (The Netherlands). June, 2019

- SPIE. Defense + commercial sensing. **Oral presentation:** *'Deep phenotyping by UAS-based imagery'*. Advanced Environmental, Chemical, and Biological Sensing Technologies XV. Baltimore (MA, USA). April, 2019
- Commercial UAV Expo America. **Oral presentation:** *'Innovative Tools for High Throughput Phenotyping by UAS data'*. Drone Industry Visionaries: University Lightning Round. Las Vegas (NV, USA). October, 2018

Research activities

- **Invited speaker:** *'4D Root Modeling by X-Ray Computed Tomography'*. Phenomics: the Systematic Study of Phenotypes. Fall 2021 Seminar series. University of Iowa (USA). Online. November 12th, 2021
- **Collaborator Researcher** in the multi-state initiative: *'Genomes To fields: Predicting Performance in variable environments'*. Co-lead: Natalia de Leon (University of Wisconsin, USA). September 2020 – December 2021
- **Board Member** at JCR journals: Frontiers and Plants (MDPI)
- **Invited speaker:** *'Biomass modeling of Soybean by Convolutional Neural Networks from UAS imagery'*. Southern Regional Research Center, USDA ARS. New Orleans (LO, USA). November 12th, 2019
- **Scientific committee member** of *'The Geospatial Week of the International Society for Photogrammetry and Remote Sensing'*. International Workshop on Laser Scanning. Twente (The Netherlands). 2019
- **Scientific committee member** of *'The International CIPA Symposium'*. Avila (ES). 2019
- **Invited speaker:** *'Deep Phenotyping in Crops by Photogrammetry'*. Polytechnic School from Avila. University of Salamanca (ES). January 2nd, 2019
- **Invited speaker:** *'Photogrammetry & Computer Vision applied to Crop Phenomics'*. Institute of Plant Breeding, Genetics and Genomics. University of Georgia (GE, USA). November 28th, 2018
- **Collaboration-stay** at the Computational Plant Science lab. University of Georgia (GE, USA). November, 2018
- **Software Developer:** *'Open-source software for high throughput plant phenotyping'*. University of Georgia (GE, USA). 2018

Teaching oriented & Additional training

- **Certificate** of *'Foundations in College Teaching'*. Purdue University (IN, USA). January, 2019. 1,5 ETC.
- **Master thesis co-supervised:** *'Multispectral Imagery Analysis'*. Vellore Institute of Technology (India). June-July, 2018
- *'Mixed Models Applied to Genetic Selection in Plant and Livestock Species'*. Purdue University (IN, USA). 2019 (3 d)
- *'Field Phenotyping of Soybean'*. Indiana Corn and Soybean Innovation Center, Agronomy Center for Research and Education (IN, USA). 2018 (3 mths)

Delft University of Technology (TU Delft) (NL)

February 2015 – December 2017

Position: Posdoctoral Researcher. Department of Geoscience and Remote Sensing. TU Delft (The Netherlands). 2015-2017

I+D Projects

- **Research Associate:** *'Smart Irrigation from soil Moisture forecast using satellite and hydro-meteorological modelling (SIM) (WaterJPI-JC-2015-12)'*. H2020. Total funded: 1175 k EUR / TU Delft: 227 k EUR. Department of Geoscience and Remote Sensing. TU Delft (The Netherlands). 2016-2017
- **Postdoctoral Researcher:** *'Managing crop water Saving with Enterprise Services (MOSES)'*. H2020-EU.3.5.4. Total funded: 4249 k EUR / TU Delft: 950 k EUR. Department of Geoscience and Remote Sensing. TU Delft (The Netherlands). 2016-2017
- **Research Collaborator:** *'Physical testing and modelling – Masonry structures (project no. C31B61)'*. Funded by Nederlandse Aardolie Maatschappij. Department of Geoscience and Remote Sensing. TU Delft (The Netherlands). 2017
- **Research Collaborator:** *'TU Delft large scale testing campaign 2016 (project no. C31B67)'*. Funded by Nederlandse Aardolie Maatschappij. Department of Geoscience and Remote Sensing. TU Delft (The Netherlands). 2016
- **Principal Investigator:** *'Analysis in rainforest by terrestrial low-cost photogrammetry using computer vision approaches and deep learning (Sulawesi, Indonesia)'*. Total funded: 10 k EUR. KNAW Academy Ecology Fund (The Netherlands). April- June 2017
- **Research Assistant:** *'IQmulus: A High-volume Fusion and Analysis Platform for Geospatial Point Clouds, Coverages and Volumetric Data Sets (FP7-ICT-2011-318787)'*. Total funded: 10922 k EUR / TU Delft: 750 k EUR. Department of Geoscience and Remote Sensing. TU Delft (The Netherlands). 2015-2016

International Congresses

- Nederlands Centrum voor Geodesie en Geo-informatica symposium. **Oral presentation:** *'Tree bark roughness index by fully automatic photogrammetric approaches'*. TU Delft (The Netherlands). November, 2017
- Geospatial Week of the International Society for Photogrammetry and Remote Sensing. **Oral presentation:** *'Generating high-temporal and spatial resolution TIR image data'*. International Workshop on Image and Data Fusion. Wuhan (China). September, 2017
- The terrestrial laser scanning revolution in forest ecology. **Oral presentation:** *'Circadian Rhythms of indoor plants based on photogrammetric deep learning'*. London (United Kingdom). February, 2017
- International Society for Photogrammetry and Remote Sensing conference. **Poster presentation:** *'Morphological Changes along a Dike Landside Slope by 4-D High Resolution Terrestrial Laser Scanning'*. International Workshop on Geo-technologies. Prague (Czech Republic). July, 2016
- Living Planet Symposium. **Poster presentation:** *'Evaluating Vegetation Index Mapping over a Vineyard from an Alternative Low-Cost Platform'*. European Spatial Agency (ESA). Prague (Czech Republic). May, 2016
- Geospatial Week of the International Society for Photogrammetry and Remote Sensing. **Oral presentation:** *'Automated large-scale parameter extraction of road-side trees sampled by a laser mobile mapping system'*. International Workshop on Geo-Big data. La Grande Motte (France). September, 2015
- Geospatial Week of the International Society for Photogrammetry and Remote Sensing. **Poster presentation:** *'Automatic tree parameter estimation by Mobile LiDAR System in an urban context'*. SilviLaser. La Grande Motte (France). September, 2015

Research activities

- **Invited speaker:** *'Image fusion in thermal spectrum'*. Remote Sensing and Digital Earth Institute, Chinese Academy of Sciences, Beijing (China). October 2nd, 2018

- **Collaboration-stay** as invited researcher at the Remote Sensing and Digital Earth Institute, Chinese Academy of Sciences, Beijing (China). September, 2017
- **Participation** at '*International benchmarking on terrestrial laser scanning (TLS) methods for forestry*'. EuroSDR test of Commission II. Finnish Geospatial Research Institute (Finland). September, 2015

Teaching oriented

- **Teaching Assistant:** '*Geostatistics & Remote Sensing*'. Department of Geoscience and Remote Sensing. TU Delft (The Netherlands). 2015-2016 (100 h), 2016-2017 (100 h)
- **Teaching Assistant:** '*Integrated assignment: Geology, Geophysics & Remote Sensing*'. Department of Geoscience and Remote Sensing. TU Delft (The Netherlands). 2015-2016 (75 h)
- **Master thesis co-supervised:** '*Hydrological modeling using thermal remote sensing data in the Heihe river basin*'. Politecnico di Milano (Italy). 2017 (1.5 m)
- **Master thesis supervised:** '*Tree bark roughness index by Terrestrial LiDAR*'. TU Delft (The Netherlands). 2017 (3 m)
- **Master thesis supervised:** '*Circadian rhythms of plants by Terrestrial LiDAR*'. TU Delft (The Netherlands). 2016 (3 m)

Additional training

- '*Close Range Sensing Techniques in Alpine Terrain (Austria)*'. **Innsbruck Summer School** of Alpine Research. International Society for Photogrammetry and Remote Sensing. 2017 (6 d)
- '*EduServ: 3D City Modelling, RADAR, Oblique Aerial Camera System and Forest Modelling*'. KU Leuven Public Governance Institute (Belgium). 2017 (500 h)
- '*Computer Vision*'. TU Delft (The Netherlands). 2015 (300 h)
- '*Management of massive point cloud data: wet and dry*'. TU Delft (The Netherlands). 2015 (60 h)

University of Salamanca (ES)

September 2011 - January 2015

Position: Research Assistant. Department of Cartographic and Land Engineering. University of Salamanca (ES). 2013-2014

I+D Projects

- **Principal Investigator:** '*Terrestrial Photogrammetry applied to Precision Viticulture*'. Total funded: 5 k EUR. Doctor TCUE Award: University-company knowledge transfer. University of Salamanca (ES). 2015
- **Guest Researcher:** '*Augmented reality to Social and Emotional Learning for people with Intellectual Disability (ASELID)*'. Vision System Group. Department of Computer Science. Dublin City University (Ireland). June-August, 2014
- **Guest Researcher:** '*Energy and Radiative Transfer Models in Agronomic Scenarios by Hyperspectral Imaging*'. Institute for Regional Development of Castilla-La Mancha (ES). September-November, 2013
- **Research Assistant:** '*ENergetic modeling for SMART cities (ENSMART)*'. Ministry of Economy and Competitiveness. Total funded: 800 k EUR / USAL: 240 k EUR. Department of Cartographic and Land Engineering. University of Salamanca (ES). 2013-2014
- **Research Assistant:** '*Gaming sensors based on photogrammetry applied to pattern recognition by Computer Vision*'. PROYESTEGAL, S.L. University of Vigo (ES). Total funded: 250 k EUR. 2012
- **Iberdrola Cathedra Grant:** '*Automation of Point Cloud Data (PCD) processing by low-cost sensors*'. Department of Cartographic and Land Engineering. University of Salamanca (ES). Total funded 100 k EUR. 2011-2012

Research activities & Additional training

- **TIDOP Research Group member:** '*Geomatic Technologies for the 3D digitalization and modelling of complex objects*'. University of Salamanca (ES). 2011-Currently
- '*Certification in Energy Efficiency*'. Eren (ES). 2012 (105 h)
- '*Management of processes for CO₂-free based on Smart Technologies*'. Ciemat (ES). 2012 (85 h)
- '*Remote sensing and geographic information systems applied to viticulture, GVisig*'. Enosat (ES). 2012 (210 h)
- '*Course in Coordinator in Occupational Health and Safety*'. Marpell (ES). 2011 (200 h)
- '*V Conference in Smart Cities*'. Higher Polytechnic University of Madrid (ES). 2010 (40 h)
- '*Course in Territorial and Urban Planning with GIS and River Modeling*'. University of Granada (ES). 2008 (170 h).

ENGINEERING EXPERIENCE

- Nechi Engineering: *Projects, Augmented Reality and Software development*. Barcelona, SP (2011)
- Urbe Enginova: *Project Design at the Department of Civil Construction*. Barcelona, SP (2010)
- Oquendo Engineers: *Construction, Supervision and Energy Audits*. Mallorca, SP (2009)
- Prointec: *Project Design at the Department of Geospatial Applications for Civil Construction*. Madrid, SP (2007-2008)

COMPUTER SKILLS

- Windows, Office, Linux; Programming languages: R, Matlab, Python, C++; Code editor: Visual Studio, Spider, Jupiter Notebook, Anaconda Prompt; Computer vision & Photogrammetry: Point Cloud Library (PCL), OpenCV, LAsTools, Visual SFM, CloudCompare, Meshroom, Regard3D; Commercial photogrammetry software: Pix4D, WebODM, Agisoft PhotoScan, Photomodeler
- Artificial Intelligent: TensorFlow, Pytorch, Keras, Deepnet; Image analysis: Osgeo4w, Ncorr, ERDAS, ENVI, ImageJ, PlantCV, Geospatial Data Abstraction Library (GDAL); Geographic Information Systems: QGIS, Gvsig, Arcgis
- CAD Modeling: MeshLab, Geomatic Spark, Geomatic Studio; Computer Drawing: Microstation SE, AutoCAD; 3D Design: 3dsMax, Photoshop, SketchUp
- Hydrogeology and Hydrology: Modflow, Hidrobass, Hec- Ras, Mike11, Iber; Energy Efficiency: Lider, Calener VYP, Calener GT
- Structures: CYPE; Cost management software for construction: Presto; Linear Projects: Ispol-Istram, Novapoint, Cadna