

Curriculum Vitae

Notarization. I have read the following and certify that this *curriculum vitae* is a current and accurate statement of my professional record.

Signature

Date 10.24.2023

I. Personal Information

I.A. Adrian Pascual, apascual@umd.edu.
4600 River Road, Suite 301. [UMD GEOG Bio](#)

I.B. Academic Appointments at UMD

Assistant Research Professor (since 2022)
NASA GEDI Science Team Mission

I.C. Other Employment

Post-doctoral Research Associate
Global Discovery and Conservation Science – Arizona State University
Partner of USDA Forest Service Institute of Pacific Island Forestry and The Asner Lab
2020-2021

Post-doctoral Research Associate
Instituto de Agronomia (ISA, Universidade de Lisboa, Portugal)
2019-2020

PhD researcher and Post-doctoral Research Associate
Doctoral studies at the University of Eastern Finland (UEF, Joensuu (Finland))
2014-2018

I.D. Educational Background

D.Sc, Decision-making & Planning & Remote sensing
Doctoral studies at the University of Eastern Finland (UEF, Joensuu (Finland))
2014-2018

MSc & Bachelor, Natural resource engineering and forestry
University of Valladolid, Spain
2006-2012

II. Research, Scholarly, Creative and/or Professional Activities

II.A. Refereed Journals

1. Liu, S., Brandt, M., Nord-Larsen, T., Chave, J., Reiner, F., Lang, N., Tong, X., Ciais, P., Igel, C., Li, S., Mugabowindekwe, M., **Pascual, A.**, Guerra-Hernandez, J., Saatchi, S., Yue, Y., Chen, Z., & Fensholt, R. (2023). The overlooked contribution of trees outside forests to tree cover and woody biomass across Europe. Accepted for publication in Science Advances. Science Advances, 9(37), eadh4097. <https://doi.org/10.1126/sciadv.adh4097>
2. Turubanova, S., Potapov, P., Hansen, M., Li, X., Tyukavina, A., Pickens, A., Hernandez-Serna, A., **Pascual, A.**, Guerra-Hernandez, J., Senf, C., Häme, T., Valbuena, R., Eklundh, L., Brovkina, O., Navrátilová, B., Novotný, J., Harris, N., Stolle, F., Tree canopy extent and height change in Europe,

- 2001-2021, quantified using Landsat data archive. *Remote Sensing of Environment*, 298, 113797. <https://doi.org/10.1016/j.rse.2023.113797>
3. **Pascual, A.**, Guerra-Hernandez, J., An integrated assessment of carbon emissions from forest fires beyond impacts on aboveground biomass. A showcase using airborne lidar and GEDI data over a megafire in Spain. *Journal of Environmental Management*, 345, 118709. <https://doi.org/10.1016/j.jenvman.2023.118709>
 4. **Pascual, A.**, Guerra-Hernández, J., Godinho, S. Integrated LiDAR-supported valuation of biomass and litter in forest ecosystems. A showcase in Spain. *Science of Total Environment*, 897, 165364. <https://doi.org/10.1016/j.scitotenv.2023.165364>
 5. **Pascual, A.**, & Guerra-Hernandez, J. (2023). Correction of phenology-induced effects in forest canopy height models based on airborne laser scanning data. Insights from the deciduous mountain forests in Picos de Europa National Park in Spain. *Ecological Informatics*, 75, 102092. <https://doi.org/10.1016/j.ecoinf.2023.102092>
 6. **Pascual, A.**, Guerra-Hernández, J., Armston, J., Minor, D. M., Duncanson, L. I., May, P. B., Kellner, J. R., & Dubayah, R. (2023). Assessing the performance of NASA's GEDI L4A footprint aboveground biomass density models using National Forest Inventory and airborne laser scanning data in Mediterranean forest ecosystems. *Forest Ecology and Management*, 538, 120975. <https://doi.org/10.1016/j.foreco.2023.120975>
 7. Tupinambá-Simões, F., **Pascual, A.**, Guerra-Hernández, J., Ordóñez, C., de Conto, T., Bravo F. (2023). Assessing the Performance of a Handheld Laser Scanning System for Individual Tree Mapping—A Mixed Forests Showcase in Spain. *Remote Sensing* 15(5):1169. <https://doi.org/10.3390/rs15051169>
 8. Guerra-Hernández, J., Narine, L., **Pascual, A.**, Gonzalez-Ferreiro, E., Botequim, B., Malambo, L., Neuenschwander, A., Popescu, S.C., Godinho, S. (2022). Aboveground biomass mapping by integrating ICESat-2, Sentinel-1, Sentinel 2, ALOS-2/PALSAR-2 and topographic information in Mediterranean forest. *GIScience & Remote Sensing* 59, 1, 1509-1533. <https://doi.org/10.1080/15481603.2022.2115599>
 9. **Pascual, A.** de-Miguel, S. (2022). Evaluation of mushroom production potential by combining spatial optimization and LiDAR-based forest mapping data. *Science of the Total Environment*, 850, 157980. <https://doi.org/10.1016/j.scitotenv.2022.157980>
 10. **Pascual, A.** De Conto, T., Tupinambá-Simões, F (2022). Using multi-temporal tree inventory data in eucalypt forestry to benchmark global high-resolution canopy height models. A showcase in Mato Grosso, Brazil. *Ecological Informatics* 70, 101748. <https://doi.org/10.1016/j.ecoinf.2022.101748>
 11. **Pascual, A.**, Guerra-Hernández, J., (2022) Spatial connectivity in tree-level decision-support models using mathematical optimization and individual tree mapping. *Forest Policy and Economics*, 139: 102732. <https://doi.org/10.1016/j.forpol.2022.102732>
 12. **Pascual, A.**, Tupinambá-Simões, F., Guerra-Hernández, J., Bravo, F. (2022). High-resolution Planet satellite imagery and multi-temporal surveys to predict risk of tree mortality in tropical eucalypt

forestry. Journal of Environmental Management 310, 114804.
<https://doi.org/10.1016/j.jenvman.2022.114804>

13. **Pascual, A.**, Giardina, C., Povak, N., Hessburg, P.H., Asner, G.P. (2022). Integrating ecosystem services modeling and efficiencies in decision-support models conceptualization for watershed management. Ecological Modelling. 466, 109879.
<https://doi.org/10.1016/j.ecolmodel.2022.109879>
14. Tupinambá-Simões, F., Guerra-Hernández, J., Bravo, F, **Pascual, A.** (2022). Assessment of drought effects on survival and growth dynamics in eucalypt commercial forestry using remote sensing photogrammetry. A showcase in Mato Grosso, Brazil. Forest Ecology and Management. 505: 119930. <https://doi.org/10.1016/j.foreco.2021.119930>
15. **Pascual, A.**; Giardina, C., Povak, N. Hessberg, P., Salminen E., Heider, C., Asner, G.P. (2022). Optimizing invasive species management using mathematical programming to support stewardship of water and carbon-based ecosystem services. Journal of Environmental Management 301: 113803. <https://doi.org/10.1016/j.jenvman.2021.113803>
16. Iván Dorado-Roda, **Pascual, A.**, Sergio Godinho, Silva C.A., Rodríguez-González, P., Eduardo González- Ferreiro, Juan Guerra-Hernández. (2021). Assessing the accuracy of GEDI data for canopy height and aboveground biomass estimates in Mediterranean forests. Remote Sensing 13, 2279. <https://doi.org/10.3390/rs13122279>
17. **Pascual, A.**, Giardina, C.G., Selmants, P., Laramée, L.E., Asner, G.P. (2021). Developing remote sensing-based indicators to support land carbon management and carbon neutrality across Hawaiian forest ecosystems. Forest Ecology and Management. 494: 119343. <https://doi.org/10.1016/j.foreco.2021.119343>
18. **Pascual, A.** Building Pareto Frontiers under tree-level forest planning using airborne laser scanning, growth models and spatial optimization. (2021). Forest Policy and Economics 128: 102475. <https://doi.org/10.1016/j.forpol.2021.102475>
19. **Pascual, A.**, Tóth, S. (2022). Using mixed integer programming and airborne laser scanning to generate forest management units. Journal of Forestry Research. <https://doi.org/10.1007/s11676-021-01348-2>
20. Guerra-Hernández, J., **Pascual, A.** (2021). Using GEDI lidar data and airborne laser scanning to assess height growth dynamics in fast-growing species: a showcase in Spain. Forest Ecosystems 8(14): 1-17. <https://doi.org/10.1186/s40663-021-00291-2>
21. **Pascual, A.** (2021). Multi-objective forest planning at tree-level combining mixed integer programming and airborne laser scanning. Forest Ecology and Management. 118714. <https://doi.org/10.1016/j.foreco.2020.118714>
22. Guerra-Hernández, J.; Arellano, S., Gonzalez-Ferreiro, **Pascual, A.**, Sandoval, V. Ruiz-Gonzalez, A.D., Alvarez-Gonzalez, J.A. (2021). Developing a site index model for P. Pinaster stands in NW Spain by combining bi-temporal ALS data and environmental data. Forest Ecology and Management 481(2): 118690. <https://doi.org/10.1016/j.foreco.2020.118690>

23. **Pascual, A.**; Guerra-Hernández, J.; Cosenza, D.N.; Sandoval, V. Using enhanced data co-registration to update Spanish NFI and optimize sampling intensity with LiDAR-assisted inference. 2020. *International Journal of Remote Sensing*. 42:1, 126-147. <https://doi.org/10.1080/01431161.2020.1813346>
24. Packalen, O., Pukkala, T., **Pascual, A.** (2020). Combining spatial and economic criteria in tree-level harvest planning. *Forest Ecosystems* 7, 18; <https://doi.org/10.1186/s40663-020-00234-3>
25. Consenza, D., Luísa Gomes-Pereira, I., Guerra-Hernández, J., **Pascual, A.**, Soares, P., Tomé, M. (2020). Impact of calibrating filtering algorithms on the quality of LiDAR-derived DTM and on forest attribute estimation through area-based approach. *Remote Sensing*, 12, 918; <https://doi.org/10.3390/rs12060918>
26. **Pascual, A.**; Guerra-Hernández, J.; Cosenza, D.N.; Sandoval, V. (2020). The Role of Improved Ground Positioning and Forest Structural Complexity When Performing Forest Inventory Using Airborne Laser Scanning. *Remote Sensing*, 12, 413. <https://doi.org/10.3390/rs12030413>
27. **Pascual, A.** (2019). Using Tree Detection Based on Airborne Laser Scanning to Improve Forest Inventory Considering Edge Effects and the Co-Registration Factor. *Remote Sensing*, 11, 2675. <https://doi.org/10.3390/rs11222675>
28. **Pascual, A.** (2019). Mejorando la gestión forestal a base de integrar datos laser y rodales dinámicos basados en optimización espacial. *Proceedings Spanish Society of Forest Sciences* 45(2), 161-170. <https://doi.org/10.31167/csecfv5i45.19869>
29. **Pascual, A.**; Rivera, R.; Gómez, R.; Domínguez-Lerena, S. (2019). Monitoring Water-Soil Dynamics and Tree Survival Using Soil Sensors under a Big Data Approach. *Sensors* 19, 4634. <https://doi.org/10.3390/s19214634>
30. **Pascual, A.**, Bravo, F., Ordoñez, C. (2019). Assessing the robustness of variable selection methods when accounting for co-registration errors in the estimation of forest biophysical and ecological attributes. *Ecological Modeling* 403(7), 11-19. <https://doi.org/10.1016/j.ecolmodel.2019.04.018>
31. **Pascual, A.**, Pukkala, T., de-Miguel, S., Pesonen, A., Packalen, P. (2018). Influence of size and shape of forest inventory units on the layout of harvest blocks in numerical forest planning. *European Journal of Forest Research*. <https://doi.org/10.1007/s10342-018-1157-5>
32. **Pascual, A.** (2018). Improving forest management planning by means of airborne laser scanning and dynamic treatment units based on spatial optimization. *Dissertationes Forestales* 257. <https://doi.org/10.14214/df.257>
33. **Pascual, A.**, Pukkala, T., de-Miguel, S. (2018). Effects of plot positioning errors on the optimality of harvest prescriptions in spatial forest planning based on ALS data. *Forests*, 9(7), 371. <https://doi.org/10.3390/f9070371>
34. **Pascual, A.**, Pukkala, T., de-Miguel, S., Pesonen, A., Packalen, P. (2018). Influence of timber harvesting costs on the layout of cuttings and economic return in forest planning based on dynamic treatment units. *Forest Systems*, 27, 1. <https://doi.org/10.5424/fs/2018271-11897>

35. **Pascual, A.**, Pukkala, T., Rodríguez, F., de-Miguel, S. (2016). Using Spatial Optimization to Create Dynamic Harvest Blocks from LiDAR-Based Small Interpretation Units. *Forests*, 7(10), 220. <https://doi.org/10.3390/f7100220>

Data products:

1. Dubayah, R.O., J. Armston, S.P. Healey, Z. Yang, P.L. Patterson, S. Saarela, G. Stahl, L. Duncanson, J.R. Kellner, J. Bruening, and **A. Pascual**. 2023. GEDI L4B Gridded Aboveground Biomass Density, Version 2.1. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/2299>

Manuscripts in review:

- Guerra-Hernandez, J., **Pascual, A.**, Tupinambá-Simões, F., Godinho, S., Botequim, B., Jurado-Varela, A., Sandoval-Altelaarrea, V. Using bi-temporal ALS and NFI-based time-series data to account for large-scale aboveground carbon dynamics. The showcase of Mediterranean forests. In review at *European Journal of Remote Sensing*.
- Hunka, N., et al., On the NASA GEDI and ESA CCI biomass maps: Aligning for uptake in the UNFCCC Global Stocktake. In Review at *Environmental Research Letters*.
- Tupinambá-Simões, F., **Pascual, A.**, Guerra-Hernández, J., De Conto, T., Ordonez, A.C., Bravo, F. Accuracy of hand-held laser scanning in tree mapping comparing leaf-on and leaf-off conditions in Mediterranean mixed forests. In Review at *Journal of Forestry Research*.
- Guerra-Hernandez, J.,Pereira. J.C., Stovall, A., **Pascual, A.** Impact of fire severity on forest structure and biomass stocks using NASA GEDI data. Insights from the 2020 and 2021 wildfire season in Spain and Portugal. In Review at *ISPRS Journal of Photogrammetry and Remote Sensing*.

Manuscripts in Progress

- Armston, J., De Conto, T., **Pascual, A.**, Global Measurements of Canopy Structure: Performance of the NASA Global Ecosystem Dynamics Investigation 2019 – 2022.
- **Pascual, A.**, de Conto, T., Kurashima, N., Jeremiah, J., Kellner, J.R., Giardina. C.P., Monitoring forest plantations using GEDI data: a showcase in Hawai'i Island (US) with relevant implications on landscape planning and carbon mitigation alternatives for landowners.
- Cardenas-Martinez, A., **Pascual, A.** Using airborne lidar and enhanced-geolocated GEDI structural metrics to map ecological indicators over Mediterranean endemic forests in Southern Spain
- Godinho, S., Guerra-Hernandez, J., **Pascual, A.**,... Accuracy assessment of GEDI spaceborne LiDAR data for vegetation structural metrics estimation in a complex Mediterranean landscape.
- De Conto, T., Armston, J., **Pascual, A.**, Dubayah, R. GEDI Waveform complexity Index.

II.B. Conferences, Workshops, and Talks

- Anthromes, CO₂, and Terrestrial Carbon – From the deep past to net-zero. Oak Ridge National Laboratory. Potomac, MD. March 28th, 2023. Title: Showcasing NASA GEDI mission data for aboveground carbon monitoring and for applications. V. Ehrenstein et al. (2023, March 30), *Anthromes, CO₂ and Terrestrial Carbon – Session 10: How to maximize terrestrial ecosystem carbon and increase global equity*. <https://doi.org/10.52843/cassyni.qs09pt>
- NASA GEDI mission presentation at the GLOBEL Seminar series (#55) supported by NSF and NASA. Seminar available online: <https://www.globe.gov/web/trees-around-the-globe/overview/webinars> . March 11th, 2023.
- AEOIP GEDI Webinar. AEOIP NASA October 21, 2022. Main speaker. <https://pikesmeetings.wixsite.com/aeoip>. (Educational Video). Webinar on the GEDI mission

- University of Hawaii'i Manoa (Honolulu, HI). Carbon Mapping in Hawaii'i. December 11th, 2022. Masterclass in the Research Seminar Series.
- University of Hawaii'i Hilo Campus (Hawaii;I Island, HI).Mapping in Hawaii'i. December 14th, 2022. Masterclass in the Research Seminar Series.
- GEO BON Open Science International Conference. 6-10 July 2020 | Leipzig, Germany. Using the GEDI satellite lidar mission with nationwide airborne laser scanning surveys in fast changing forest ecosystems. Oral presentation
- Symposium Decision Support to Improve Ridge-to-Reef Stewardship in an Era of Rapid Global Change". Organized by USDA Forest Service & IPIF. Hawaii Island, June 2021.
- Statistical relationships and management actions to perform decision-making learning from Hilo-Hamakua towards South-Kona". Oral presentation.
- International Tropical Islands Water Conference. Hawaii in April 2021. Using mathematical optimization to manage and value land-water ecosystem services and invasive species in Hawaii'i Island, USA". Oral presentation
- Ecosystem Services Science, Policy and Practice in the face of Global Changes (Estonia). Valuation of land-water ecosystem services and invasive species when using Pareto Frontiers: a showcase in Hawaii'i Island, USA. Oral presentation
- The International Society for Ecological Modelling Global Conference 2019. 1-5 October 2019 | Salzburg, Austria. Importance of edge-tree detection when modelling tree and forest characteristics. Oral presentation
- SuFoRun Final Conference. Ubatuba (Brazil). October 2019.Promoting fire risk reduction in harvest scheduling problems. Oral presentation.
- Symposium on Systems Analysis in Forest Resources. March 2019. (Chile). Towards enhanced tree-level planning using laser scanning and spatially-explicit tree selection methods. Oral presentation.
- Symposium on Systems Analysis in Forest Resources. 2017. (Washington, USA). Assessing the role of forest inventory units to compose dynamic treatment units in forest management planning. Session Chair & Oral presentation

II.C. Significant Works in Public Media

1. ***"Por qué la NASA dispara rayos láser a los árboles desde la Estación Espacial Internacional"***

Date Published: August 11th, 2023 (media article)

BBC News

Number of People who Read the Publication: Over 8.5 million monthly unique visitors read BBC Mundo stories. Summary of Article's Focus: The NASA GEDI mission. Link:

<https://www.bbc.com/mundo/noticias-62479696> &

<https://www.youtube.com/watch?v=scvyyWqQpww>

Relevance to my UMD work: Major support for the extension of the mission. I received multiple requests and interest after the interview was published.

II.D. Sponsored Research and Programs – Administered by the Office of Research Administration (ORA)

1. NASA 2022 Carbon Monitoring System Call

Reference: 22-CMS22-0038- "Pantropical structure and biomass mapping using the fusion of GEDI and TanDEM-X data - Phase II: expansion to new regions and estimating change"

Status: Recommended for funding. Contribution as Co-I: 10%. PI: Ralph Dubayah

Total budget: USD 1.185 million

2. USDA-Forest Service - Pacific Southwest Research Station

Reference: 'Expanding Forest Management and Promoting Ecosystem Services through access to Environmental Markets'

Status: In-progress (2021-2023). Role: Collaborator.

II.E. Research Fellowships, Prizes and Awards

1. Best PhD thesis in Spain

My Phd thesis was awarded as the best PhD thesis in Spain for year 2018. It was awarded by the Spanish Society of Forest Sciences.

III. Teaching, Extension, Mentoring, and Advising

III.A. Professional and Extension Education

- University of Eastern Finland (18 h)
 - Teaching Assistant: Spatial optimization and utilization of new data sources in forest planning. Spring 2016. Supervisor: Prof. Petteri Packalen
 - Advanced Remote Sensing: Spring 2018. Supervisor: Senior Researcher Lauri Korhonen
 - Forest Biometrics. Spring 2014. Supervisor: Senior Researcher Jari Vauhkonen
- University of Valladolid (Spain) (76 h)
 - Main lecturer: Winter 2017 (25 h). Host: Professor Felipe Bravo. Supported by Erasmus+ EU programme Remote sensing applications for forest inventory and forest management planning MedFOR master. 5-day seminar
 - Winter 2018 & 2019 (15 + 15 h). In cooperation with Professor Felipe Bravo and Dr. Juan Suarez (Forestry Commission, UK). Role: lecturer on data visualization, data processing and modelling. Thematic: lasers for forestry applications.
 - Spring 2019. (21 h). Associated Researcher for the MedFor Consortium. Theory on forest management planning, basics of remote sensing 7
 - Advanced data processing for laser applications in forestry and integration of satellite image information into decision-making in natural resource assessment.
- European Forest Institute School (Spain) (8 h)
Summer school on Forest Data Management and Analysis. Lecturer (Spring 2018)
- University of Concepción (Chile) (15 h)
Introduction to Laser Scanning Applications for 3D Forestry. Lecturer (Spring 2019)

IV. Service and Outreach

IV.A. Editorships, Editorial Boards, and Reviewing Activities

Name of Organization: Forest Policy and Economics

Role: Associate Editor

Dates of Service: Since 2022

FPE is a leading scientific journal that publishes peer-reviewed policy and economics research relating to forests, forested landscapes, forest-related industries, and other forest-relevant land uses. Responsibilities: Handle submissions, revise articles and advice senior editors

Academics journals I have reviewed for:

Remote Sensing (13 submissions), Forest Policy and Economics (10), Canadian Journal of Forest Research (2), Forest Science (1), Forests (4), International J Geo-Information (1), Scientia Agricola (1), Inter Journal of Remote Sensing (3), Regional Environmental Change (1), Scandinavian J Forest Research (2), SN Applied Sciences (1), Forest Ecosystems (1), Journal of Forestry Research (1), Methods in Ecology and Evolution (1), Journal of Environmental Management (4), Silva Fennica (1), Remote Sensing Applications: Society and Environment (1), Nature (2), Forest Systems (1), Environmental Research Ecology (1), GIScience Remote Sensing (1), Forestry (1), Scientific Reports (1). Total: 54 manuscripts revised.

IV.B. Committees, Professional & Campus Service

2023 UMD Geography Promotion Committee. Postdocs to Assistant Research Professor

IV.C. External Service and Consulting

Consulting for NASA on calval activities for the GEDI mission. Winter 2022

Consulting for Kamehamkeha Schools on forest carbon mapping. December 2022

Consulting for Hawaii Forestry and Wildlife Department and the USDA Forest Service Fall 2020