António Ferraz

Remote Sensing Scientist & Science Systems Engineer

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Remote sensing scientist with over 12 years of experience developing algorithms for forest structure, biodiversity, ecology, phenology, disturbance, and carbon mapping, with a focus on tropical and Mediterranean ecosystems. Skilled in the fusion of in-situ, drone, airborne, and multi-sensor satellite observations (lidar, radar, multispectral, spectroscopy) using physically based and machine learning models.

Experienced in integrating remotely sensed habitat characterization with biologically informed datasets (e.g., field inventory, bioacoustics, animal movement) to support policy-making, conservation, and ecosystem restoration.

Proficient in developing software using C++, R, Python, GDAL, and MATLAB for handling and processing large geospatial datasets. Advanced user of open-source tools and libraries. Led teams conducting work on high-performance computing (HPC) systems and cloud-computing platforms.

Designed and led to multiple successful projects focusing on workflows to transform Earth Observation (EO) data into actionable data products, indicators and tools that support ecosystem and biodiversity management decision, using cutting-edge AI techniques, EO Foundation Models, and Digital Twins.

Project Scientist for Pre-Phase A satellite missions: engaged with stakeholders to define user needs, mission objectives, and product requirements; led science–technology trade-off analyses; assessed technical feasibility via prototyping and system-level engineering; and evaluated satellite architecture options considering cost, performance, and risk.

Publisher of EO data products in NASA DAACs and other public repositories.

António has been serving as PI or Co-I for several NASA Programs, namely PI for the NASA GEDI Science Team, PI for the NASA Commercial Smallsat Data Acquisitions program, PI for the Decadal Survey Incubation Study: Structure, Topography and Vegetation (DSI-STV) , Science PI and Co-I for the NASA Advanced Information Systems Tecnhology, Co-I for the NASA Biodiversity and Ecological Forecasting Science Team, Co-I for the NASA BioSCape Science Team, Co-I for the Applications-Oriented Augmentation for Research and Analyses program, CO-I for the NASA CYGNSS Science Team, Co-I for the NSF Biological Sciences Program.

Project Scientist for the NASA JPL Internet of Animals (IoA) Project.
Lead of the NASA-JPL Strategist Trust Area on Biodiversity Change.

Experience

Dates	2022- Present
Position held	**Scientist, Biosphere Group, Earth Science Section**
Main activities	- Lead spaceborne missions' development, identifying stakeholders' science and application requirements - Desing end-to-end workflows to monitor Ecosystem Change using AI, Foundational Models and Digital Twins. - Satellite multi-sensor fusion and integration with in-situ to derive user-oriented data products.
Employer	NASA Jet Propulsion Laboratory, Pasadena, CA (USA), California Institute of Technology, Pasadena, CA (USA)
Sector	Space Agency

Dates	2017-Present
Position held	**Project Scientist at UCLA**
Main activities	- National-level structure and carbon mapping by integrating in-situ, airborne satellite remote sensing - Tree size-abundance distributions and tree crown allometry variability across tropical forests using airborne lidar - Community-level Forest structure demographics to calibrate Earth System Models
Employer	Institute of Environment and Sustainability, University of California, Los Angeles, CA (USA) NASA Jet Propulsion Laboratory, Pasadena, CA (USA)
Sector	Education and Research, Space Agency
Dates	5/2016 – 5/2017
Position held	**Caltech postdoc scholar at the NASA Jet Propulsion Laboratory**
Main activities	- Algorithm to fusion low-resolution time-series of NASA Airborne Snow Observatory (ASO) lidar data - Forest structure and disturbance monitoring over Sierra Nevada, California, using NASA ASO lidar data
Employer	California Institute of Technology, Pasadena, CA (USA) NASA Jet Propulsion Laboratory, Pasadena, CA (USA)
Sector	Education and Research, Space Agency
Dates	5/2014 – 5/2016
Position held	**NASA postdoctoral fellow at the NASA Jet Propulsion Laboratory**
Main activities	- Algorithms for individual trees extraction in tropical forests using airborne lidar data - Estimates on biomass/carbon stocks and uncertainties using remote sensing and field data -- Field work operator for soil moisture measurements in La Selva biological station and Harvard Forest
Employer	NASA Jet Propulsion Laboratory, Pasadena, CA (USA)
Sector	Space Agency
Dates	7/2012 – 1/2014
Position held	**Postdoctoral fellow**
Main activities	- Forest roads extraction using image processing methods over large mountainous areas using lidar imagery - Big data handling and processing - Aboveground biomass estimates using lidar data and field measurements over French forests
Employer	IGN- Institut national de l'information géographique et forestière, Saint-Mandé, Paris (France)
Sector	French mapping agency
Dates	11/2007 - 4/2012
Position held	**Work placement as PhD student**
Main activities	- Methods for forest variables estimation using lidar data - Handling and processing full waveform airborne lidar data using open-source C++ libraries - Development of tools for 3D point clouds processing using open-source C++ libraries
Employer	IGN - Institut national de l'information géographique et forestière, Saint-Mandé, Paris (France)
Sector	French mapping agency
Dates	11/2006 - 06/2007

Position held	**Student trainee**
Main activities	Research and development of new add-on modules to ENVI package using Interactive Data Language (IDL): -Radiometric Top-of-Atmosphere correction for multi-temporal Landsat and Spot satellite images - Self-supervised urban land cover classification of high-resolution aerial and satellite imagery - Automated building extraction using Differential Morphological Profiles and high-resolution satellite imagery
Employer	INFORM SRL / INFRACOM, 56, Via Savelli Giovanni, 35129 Padova (Italy)
Sector	IT and Environment

Education

Dates	2012
Title of qualification awarded	**Ph.D., Geophysics**
Principal subjects	3D mapping of a multi-layered forest using airborne laser scanning data
Organization	IPGP- Institut de Physique du Globe de Paris, Université Denis Diderot, Paris VII, Paris (France)

Dates	2007
Title of qualification awarded	**M.Sc., Geospatial Engineering**
Principal subjects	geographic information systems (GIS), applications programming, image processing, cartography, digital mapping, geodesy, photogrammetry, remote sensing, surveying
Organization	Faculdade de Ciências e Tecnologia da Universidade de Coimbra, Coimbra (Portugal)

Skills and competences

Languages

Mother tongue **Portuguese**

Other language(s)

	Understanding				**Speaking**				**Writing**	
	Listening		Reading		Spoken interaction		Spoken production			
English	C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user
French	C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Independent user
Spanish	B2	Independent user	C1	Proficient user	B1	Independent user	B1	Independent user	A1	Basic User
Italian	B2	Independent user	B2	Independent user	B1	Independent user	B1	Independent user	A1	Basic User

Social
- Experienced in multicultural environments in different member states of the European Union and the USA
- Capacity for effective communication across cultural and linguistic boundaries

Technical
- Knowledge of the main remote sensing techniques and image processing methods
- Experienced in pattern recognition and classification techniques
- Expert on remote sensing of forest inventory, strcuture and functional diversity
- Task-oriented applications programming using open source and proprietary languages

- Large scale data processing and cloud computing
- Machine learning methods for classification and interpolation of spatial data
- Experimented in field work over tropical (Costa Rica), Mediterranean (Portugal) and temperate forests (Les Vosges, France, and Harvard Forest, Massachusetts)

Computer

OS: LINUX, MAC OS X, Windows XP

Software: ENVI, ArcGis, Microsoft Access, QGIS, GDAL, GeoWebPublisher (Bentley Systems), TerraScan

Languages: C++, R, IDL, MATLAB, Python

C++ libraries: CGAL, ITK, OTB, LidarFormat, libLAS, LAStools

Protocols: Web Map Service (WMS)

Editor activities

Guest Editor:

Mallet, Clément (IGN, France); **Ferraz**, **António** (NASA-JPL, US); Neuenschwander, Amy (University of Texas, US), "Analysis and Applications of Full-waveform lidar", Special issue in the Journal *IEEE Geoscience and Remote Sensing Letters*.

Ferraz, António (NASA-JPL, US); Garcia, Mariano (University of Alcalá Spain), Valbuena, Rubén (Bangor University, UK), "Lidar Remote Sensing of Forest Structure, Biomass and Dynamics" Special Issue in the Journal *Remote Sensing*.

Strategist Lead/ Project Scientist

- Biodiversity Change from Space, a new Strategic Trusts Area at NASA-JPL
- Internet of Animals, a 5-year NASA project within the NASA Satellites Needs Working Group (SNWG)
- NASA-JPL Decadal Survey Study Plan: Lead of the Biodiverisyt Change Societal Benefit Trust Area

Principal Investigator

- (Science PI) Advanced Information System Technology (NNH23ZDA001N-AIST). Earth System Digital Twin for Central Africa Carbon and Biodiversity Corridors. (Ref. 23-AIST23_2-0049)
- Decadal Survey Incubation Program: Science and Technology (NNH24ZDA001N-DSI). 3D forest structure retrievals using AI Foundational Models and multi-modal satellite time-series data (Ref. 24-DSI24-0095)
- Commercial Smallsat Data Scientific Analysis Team (NNH22ZDA001N-CSDSA): Monitoring the distribution, phenology and mortality of selected tropical tree species from space. Ref. 22-CSDA22_2-0088
- NASA GEDI Science Team (NNH20ZDA001N-GEDIST): Functional diversity-biomass relationships across continents and intactness gradients. Ref: 20-GEDIST20-0039

Projects Co-I/Collaborator

- (Co-I) Global Ecosystem Dynamics Investigation Science Team (NNH23ZDA001N-GEDI). Understanding post-fire disturbance forest recovery in Mediterranean ecosystems using GEDI. Ref. 23-GEDI23-00300
- (Co-I) CYGNSS Competed Science Team (NNH23ZDA001N-CYGNSS). Uncovering the role of surface water on forest structure: a coupled CYGNSS-GEDI Investigation. Ref. 23-CYGNSS23-0027
- (Co-I) Applications-oriented Augmentation for Research and Analysis (NNH22ZDA001N-AA4RA). Development of an animal species detection and monitoring web-based application based on bioacoustics and artificial intelligence. Ref. 22-AA4RA22-0010
- (Collaborator) Scoping studies for the next terrestrial ecology field campaign (NNH22ZDA001N-TE): A scoping study for the NASA tropical Terrestrial Ecology Campaign Ref 22-TE22-0006
- (Co-I) NASA AIST (NNH21ZDA001N-AIST): Ecological Projection Analytic Collaborative Framework (EcoPro)
- (Co-I) NASA BioSCape (21-BIODIV21-0005): Connectiong acoustics and remote sensing to study habitat-animal diversity across environmental gradients
- (Co-I) NASA Biodiversity (NNH20ZDA001N-BIODIV): Understanding seed dispersers movement and their consequences across rainforest gradients of structural and phenological diversity. Ref. 20-BIODIV20-0044
- (Co-I) A mechanistic approach to assess the impacts of an intensified hurricane disturbance regime on tropical forests. National Science Foundation, Division of Environmental Biology, Ref: 2028688 https://www.nsf.gov/awardsearch/showAward?AWD_ID=2028688&HistoricalAwards=false
- Accurate Above Ground Biomass Estimation using novel hierarchical datasets to train Machine Learning Models, The Sustainable Innovation Fund: SBRI phase 2. UK Research and Innovation (UKRI), ref: 10004871, https://gtr.ukri.org/projects?ref=10004871

- Next Generation Ecosystem Experiments – Tropics (NGEE-tropics), Funded by DOE SC, Grant #, https://ngee-tropics.lbl.gov/
- Catastrophic forest disturbance and regrowth in Puerto Rico following hurricane Maria: benchmarks for earth systems models from forest inventory and remote sensing measurements. Funded by DOE SC, Grant # 89243018SSC000013
- Sierra Nevada Complex Terrain Soil Moisture (CTSM) Deployment (P-band). Funded by NASA Earth Science Airborne Program (https://uavsar.jpl.nasa.gov/cgi-bin/deployment.pl?id=P20180528).
- Airborne Snow Observatory (ASO). Funded by NASA Terrestrial Hydrology, NASA Applied Sciences, and California Department of Water Resources.
- Airborne Microwave Observatory of Subcanopy and Subsurface (Airmoss, 2014-2015). Funded by NASA Earth Ventures-1, Earth Science Airborne Program
- NASA Carbon Monitoring System (CMS) project in Kalimantan, Indonesia (2013-2017). Funded by NASA (Grant #NNX13AP88G).
- Carbon Map and Model (CO_2M&M, 2012-2016). Funded by Federal Ministry of the Environment, Conservation, and Nuclear Security of Germany and implemented by the German Development Bank (KfW), World Wide Fund for Nature (WWF) and the Ministry of Environment, Nature, Conservation and Tourism of the Republic Democratic of Congo (https://www.international-climate-initiative.com/en/nc/details/?projectid=66&iki_lang=en).
- Forest Resource Estimation for Energy (FORESEE, 2010-2014). Funded by ANR- French National Research agency (research project ANR-2010-BIOE-008)
- Forest and Fuel variables estimation and digital terrain modelling with airborne laser scanning and high resolution multi-spectral images (2006-2009). FCT- Portuguese Foundation for Science and Technology (research project PTDC/AGR—CFL/72380/2006)

Other activities

PhD. Committee Membership:
Oliver Stocker, "Data simulation for deep learning applications on forestry airborne lidar point clouds", Laval, University
Scientific board: 1 Jornadas Lusófonas de Ciências e Tecnologias de Informação Geográfica – CTIG 2014
Scientific projects consulting:
-Visiolyptus: Development of remote sensing tools for the forest inventory and forest management over eucalyptus stands in Portugal". Funded by the European Commission Horizon 2020 project.
-CartoDiv-DendroLidar: Individual tree mapping over tropical canopies and tree modeling to estimate lumber stockage in French Guiana. Funded by French Government trough the National multi-Actor Approach (MAA) in the framework of the Strategic Fond for forest and wood (FSFB) and implemented by the French Agricultural Research Centre for International Development (CIRAD) and the French Space Agency (CNES) (http://amap.cirad.fr/fr/edite_projet.php?projet_id=92)

Awards & Honors

2014-2016, **NASA Postdoctoral Program Fellowship** at Jet Propulsion Laboratory, Pasadena, USA
2007-2011, **FCT Ph.D. Grant** Portuguese Foundation for Science and Technology for Ph.D. at IPGP (France).
2007, **European Union (EU) Leonardo da Vinci Program Grant** for Master internship at INFRACOM (Italy)
2007, **Banco Português de Investimento** award 1st ranked graduation student in Geospatial Engineering
2006, **Caixa Geral de Depositos** awards for 1st ranked student in Geospatial Engineering (2006)

Reviewer

Grants
NASA ROSES grants panel review (USA)
NASA Postdoctoral Program (NPP, USA)
NERC Independent Research fellowship (UK)
French National Research Council (France)

Journals
Remote Sensing of Environment
Ecological Applications
Trends in Ecology & Evolution
Environmental Research Letters

New Phytologist
IEEE Transactions on Geoscience and Remote Sensing
ISPRS Journal of Photogrammetry and Remote Sensing
Journal of Geophysical Research - Biogeosciences
ISPRS International Journal of Geo-Information
Geoscience and Remote Sensing Letters
PLOS ONE
Royal Society Open Science
Remote Sensing
International Journal of Remote Sensing
Earth Science Informatics
The Photogrammetric Record
IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
IEEE Access
IEEE Geoscience and Remote Sensing Letters
Forests
Agricultural and Forest Meteorology
Computers and Electronics in Agriculture
Frontiers in Plant Science
CERNE
Machine Learning Science and Technology
Journal of Applied Remote Sensing
Canadian Journal of Forest Research
Biogeosciences
Journal of Environmental Management
International Journal of Digital Earth
Frontiers
Journal of Spatial Science
Geo-spatial Information Science

Conferences

AGU Fall meeting 2019 Student Earth and Science Virtual Poster showcase (US)
ISPRS Conferences and workshops
Jornadas Lusófonas de Ciências e Tecnologia de Informação Geográfica

Publications

Peer-Reviewed Journals

Hughey, L., Scarpignato, A. L., Harrison, A.-L., Arumugam, D., Bobo, M., Boelman, N., Bonfield, S., Brosnan, I., Burnett, J., Bush, J. D., Carlson, B. S., Chan, S., De La Cruz, S., Curtis, T., Deppe, J., Ellis-Soto, D., Feyissa, B., Fouda, L., Gaddis, K., Gilmour, M., Graves, T., Honda, A., Ianarilli, F., Jetz, W., Kellenberger, B., Killion, A., Koltz, A. M., Lanctot, R. B., Leimgruber, P., Marra, P. P., McGrath, J., Oliver, R. Y., Pass, S., Pavlick, R., Peltzer, G., Rogers, W., Rogerson, S., Rudic, T., Russo, N. J., Teitelbaum, C., Vogas, L., Wikelski, M., Wilson, C., Berger-Wolf, T., Yanco, S. W., & **Ferraz, A.** (in preparation). Towards a next-genetration satellite observing system for animal tracking: Part I, User Requirements. BioScience.

Kalmus, P., Geller, G., Assal, T., Cavender-Bares, J., Bowser, A., Daskin, J., Dunfee, M., Elsen, P., Gade, M., Kachergis, E., Marando, F., McIntyre, P., Newmark, J., Paganini, M., Pickens, B., Schimel, D., Schneider, F., Tarjan, M., Turner, W., Wasley, T., Wiltermuth, M., & **Ferraz, A.** (in preparation) Gaps in satellite remote sensing for biodiversity monitoring and decsion-making. Nature Reviews Biodiversity

Doran, G., **Ferraz, A.**, Kalmus, P., Lee, S. (in preparation) Modeling treee mortality to forecast habitats shifts and guide sustainable management of Sierra Nevada conifer forests. Global Change Biology

Dean, M., **Ferraz, A.**, Ordway, E. M., & Schneider, F. D. (under review) Systematic evaluation of GEDI-derived forest strcutre mapping in the tropics. Remote Sensing of Environement.

Schneider, F. D., Dean, M., Ordway, E. M., Libalah, M. B., & **Ferraz, A.** (2026) Mapping the structural diversity of Central and Western US forests usign GEDI. Remote Sensing of Environement, 334, 115215.

King, R. A., Barger, N. N., Chaplin-Kramer, R., Chapman, M., Chaudhary, V. B., Cillero, C., Cimino, M. A., DeMattei, B. C., Fredston, A., **Ferraz, A**., Gallery, R. E., Jennings, L. L., Meyer, M. F., Muller-Karger, F. E., Oliver, R. Y., Schneider, F. D., Vidal Meza, A., Yang, X., Schimel, D., Hampton, S. E., & Halpern, B. S. (in review). The untapped potential of tecnhology for automated biodversit systems. Proceedings of the National Academy of Sciences (PNAS).

Oliver, R. and 62 co-authors (in review) Seven reasons why we need movment-based indicators in global policy. Nature Reviews Biodiversity.

Han, T., **Ferraz, A**., Fang, D., Zheng, T., Ankori-Karlinsky, R., Arellano, G., Morton, D., Zimmerman, J. K., Keller, M., Uriarte, M., & Xu, X. (in review). Taller trees experienced less crown dammage during a severe hurricane in a tropical forest. Global Change Biology. 32, no. 1: e70709.

Ferraz, A., Keller, M., Saatchi, S., Longo, M., Ommeto, J. (in review). One Amazon, many forests: gradients and controls of biophysical variability from lidar tree corwn inventory. *Nature Communications*.

Braghiere, R. K., Wang, Y., Liu, K., Chadwick, K. D., Brodrick, P. B., Shiklomanov, A. N., Schneider, F. D., **Ferraz, A**., Zheng, T., Queally, N., Townsend, P. A., Schimel, D., Frankenberg, C. (under review) Shifting from Plant Functional Types to Traits: Enhancing Biodiversity Representation in Earth System Models. Ecosphere

Turner, A. A., Clark, M. L., Salas, L., Seymour, C., Snyder, R. L., Lee, A. T. K., **Ferraz, A**., Schneider, F., Measey, J., Huisamen, J., Cloete, D., Hofmeyr, S. D., Hagen, C., Leland, D. F., Schackwitz, W., Adegbola, F., Hahndiek, E., Joseph, G. S., Van Rooi, J., Fuchs, M., Thomas, S., Madlala, S., Spiby, J., & Taljaard, P. (2025). BioSoundsSCape : A bioacoustic dataset fro the Fynbos Biome. Scientific Data, 12, 1432.

Longo, M., Keller, M., Kueppers, L. M., Bowman, K., Csillik, O., **Ferraz, A.**, Moorcroft, P. R., Ometto, J. P., Soares-Filho, B. S., Xu, X., de Assis, M. L. F., Görgens, E. B., Larson, E. J. L., Needham, J. F., Ordway, E. M., Pereira, F. R. S., Pinagé, E. R., Sato, L., Xu, L., & Saatchi, S. (2025). Degradation and Deforestation Increase the Sensitivity of the Amazon Forest to Climate Extremes. Environmental Research Letters, 20 054024.

Antoine T.S.A., Russo N.J., Bonaventure S., Deblauwe V., Nshom, D.L., Barbier, N., **Ferraz A**., Saatchi, S., Wikelski, M., Ordway, E.M., Smith, T. B. (in press). Habitat Selection and Seed Dispersal by the Great Blue Turaco (*Corythaeola cristata*) in the Rainforests of southern Cameroon. Biotropica. 58, no. 1: e70153

Nicholas J. Russo, N., Takuo, J.M., Tegebong, V., LeBreton, M., Dean, M., **Ferraz, A**., Barbier, N., Wikelski, M., Ordway, E.M., Saatchi, S., Smith T.B. (2025). Spaceborne LiDAR revels hammer-headed bat preference for intermediate canopy height and diverse strcucture in a Central Africa rainforest. Movement Ecology 13, 30

Teitelbaum C. S., **Ferraz, A**., De la Cruz, S.E.W., Gilmour, M., Brosnan, I., G. (2024). The potential of remote sensing for improved infectious disease ecology research and practice, Proceedings B 291. 2037.

Russo, N., Nshom D., **Ferraz A**., Barbier, B., Wikelski M., Noonan M., Ordway, E., Saatchi, S., Smith, T., (2024) Three-dimensional vegetation structure drives patterns of seed dispersal by African hornbills, Journal of Animal Ecology, 93, 1935-1946.

Csillik, O., Keller, M., Longo, M., **Ferraz, A.**, Rangel Pinagé, E., Görgens, E., Pierre Ometto, J., Silgueiro, V., Saatchi, s. (2024). A large net carbon loss attributed to anthropogenic and natural disturbances in the Amazon Arc of Deforestation. Proceedings of the National Academy of Sciences (PNAS), 121 (3).

Dehaudt, B., Bruce, T., Deblauwe, V., **Ferraz, A.,** Gardner, B., Bibila, T., LeBreton, M., Mempong, G., Njabo, K., Nkengbeza, S., Ordway, E., Pavan, L., Russo, N., Smith, T., Luskin, M., (2024). Divergent seed dispersal outcomes: interactions between seed, disperser, and forest traits. Ecology. 105 (10)

Duncanson , L. and 107 co-authors (2022). Development of Abovegroung Biomass Density Models for the Global Ecosystem Dynamics Investigation (GEDI) Lidar Misson. Remote Sensing of Enviroment, 270.

Leitold, V., Morton, D., Martinuzzi, S., Paynter, I., Uriarte, M., Keller, M., **Ferraz**, A., Cook, B., Lawrence, C., González, G. (2021). Tracking the rates and mechanisms of canopy damage and recovery following Hurricane Maria using multitemporal lidar data. *Ecosystems*.

Longo, M., Saatchi, S., Keller, K., Bowman, K., **Ferraz, A.**, Moorcroft, P. R., Morton, D. C., Bonal, D., Brando, P., Derroire, G., dos-Santos, M., N, Meyer, V., Saleska, S., Vincent, G., Xu, X. (2020). Impacts of degradation on water, evergy, and carbon cycling of the Amazon tropical forests. Global Biogeochemical Cycles, 125.

Schneider, F., **Ferraz, A.**, Hancock, S., Duncanson, L., Dubayah, R., Pavlick, R., Schimel, D. (2020). Towards mapping the diveristy of canopy structure from space with GEDI. Environmental Research Letters, 15, 115006

Ferraz, A., Saatchi, S., Longo, M., Clark, D. (2020). Tropical tree size-frequency distributions from airborne lidar. *Ecological Applications* 30(7):e02154.

Clark, D. B., **Ferraz, A.**, Clark, D. A., Kellner, J. R., Letcher, S. G., Saatchi, S. (2020). Diversity, distribution and dynamics of large tropical trees across an old-growth lowland tropical rain forest landscape. *PloS ONE* 14(11) e0224896..

Schimel, D., Schneider, F., Bloom, A., Bowman, K., Cawse -Nicholson, K., Elder, C., **Ferraz, A.**, Fisher, J., Hulley, G., Liu, J., Magney, T., Meyer, V., Miller, C., Parazoo. N., Pavlick, R., Podest, E., Saatchi, S., Stavros, N., Keller, M., Townsend, P., Zheng, T., JPL Carbon and Ecosystems Participants (2019). Flux towers in the sky: Global ecology from space. (Tansley Review) New Phytologist.

Aubry-Kientz, M., Dutrieux, R., **Ferraz, A**., Saatchi, S., Hamraz, H., Williams, J., Coomes, D., Piboule, A., Vincent, G., (2019). A Comparative Assessment of the Performance of Individual Tree Crowns Delineation Algorithms from ALS Data in Tropical Forests. Remote Sens. 11.

Meyer, V., Saatchi, S., **Ferraz, A.**, Xu, A., Duque, A., Alonso, M., Chave, J. (2019). Forest degradation and biomass loss along the Chocó region of Colombia. Carbon balance and management, 14:2.

Cawse-Nicholson, K., Fisher, J. B., Famiglietti, C. A., Braverman, A., Schwandner, F. M., Lewicki, J. L., Townsend, P. A., Schimel, D. S., Pavlick, R., Bormann, K. J., **Ferraz, A.**, Kang, E. L., Ma, P., Bogue, R. R., Youmans, T., and Pieri, D. C. (2018). Ecosystem responses to elevated CO_2 using airborne remote sensing at Mammoth Mountain, California, *Biogeosciences, 15, 7403-7418*.

Ferraz, A., Saatchi, S., Xu, L., Hagen ,S., Chave, J., Yu. Y, Meyer, V., Garcia, M., Silva, C, Roswintiart, O., Samboko, A., Sist P., Walker, S., Pearson T. R.H., Wijaya, A., Sullivan, F.,Rutishauser, E., Hoekman D., Ganguly, S. (2018). Carbon Storage Potential in Degraded Forests of Kalimantan, Indonesia. *Environmental Research Letters*, 13 (9).

Bastin, J-F. and 135 more (2018). Pan-tropical prediction of forest structure from the largest trees. *Global Ecology and Biogeography*.

Labrière, N., Tao, S., Chave, J., Scipal, K., Toan, T, Abernethy, K., Alonso, A., Barbier, N., Bissiengou, P., Casal, T., Davies, S.J., **Ferraz**, A., Hérault, B., Jaouen, G., Jeffery, K. J., Kenfack, D., Korte, L., Lewis, S.L, Malhi, Y., Memiaghe, H.R., Poulsen, J.R., Réjou-Méchain, M., Villard, L., Vincent, G., White L. J. T., Sassan S. (2018), In situ reference datasets from the TropiSAR and AfriSAR campaigns in support of upcoming spaceborne biomass missions. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 99, 1-11.*

Meyer, V., Saatchi, S., Clark, D., Keller, M., Vincent, G., **Ferraz, A.**, Espirito-Santo, F., d'Oliveira, M., Kaki, D., Chave, J. (2018). Canopy area of large trees explains aboveground biomass variations across neotropical forest landscapes. *Biogeosciences*, 15, 3377-3390.

Silva, C.A., Saatchi, S.S., Garcia M., Labriere, N., Klauberg, C., **Ferraz, A.**, Meyer, V, Jeffery, K.J., Abernethy, K., White, L., Zhao, K., Lewis, S., Hudak A.T. (2018) Comparison of Small- and Large-Footprint Lidar Characterization of Tropical Forest Aboveground Structure and Biomass: A Case Study From Central Gabon, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 99, 1-15*.

Ferraz, A., Saatchi, S., Bormann, K.J., Painter, T.H. (2018). Fusion of NASA Airborne Snow Observatory (ASO) Lidar Time Series over Mountain Forest Landscapes. Remote Sensing, 10, 164.

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