Carlos Alberto Silva, Ph.D. March/2023

Assistant Professor of Quantitative Forest Science
Forest Biometrics, Remote Sensing, and Artificial Intelligence (SilvaLab)
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BIOGRAPHY

Carlos Alberto Silva is an Assistant Professor of Quantitative Forest Science in the School of Forest, Fisheries, and Geomatics Sciences (SFFGS) at the University of Florida (UF). He directs the Forest Biometrics, Remote Sensing, and Artificial Intelligence Lab (Silva Lab) and he is interested in using field and remote sensing data, particularly, lidar (light detection and ranging) data acquired from airborne (ALS), terrestrial (TLS), and satellite platforms (e.g. GEDI, ICESat-2), and combined with SAR (Synthetic Aperture Radar), optical satellite data (e.g. Landsat) and artificial intelligence algorithms to address ecological questions related to vegetation structure, disturbance, and dynamics at a variety of spatial scales. He is also interested in developing statistical frameworks and open-source tools (e.g., rGEDI, rLiDAR, ForestGapR) for remote sensing data processing and vegetation structure and wildland fuel mapping in 4D (space and time). Previously, he has worked at the USDA Forest Service, University of Idaho, NASA Jet Propulsion Laboratory and University of Maryland/NASA Goddard Space Flight Center.

EDUCATION

University of Idaho - College of Natural Resources - Department of Natural Resources and Society **2014-2018**
Ph.D., Natural Resources
Advisor: Lee A. Vierling, Ph.D.; Andrew T. Hudak, Ph.D.
Dissertation: "Advanced methods for 3D forest characterization and mapping from lidar remote sensing data"

University of São Paulo – "Luiz de Queiroz" college of Agriculture –ESALQ **2012 - 2013**
MSc., Forest Resources with emphasis on silviculture and forest management
Advisor: Luiz Carlos Estraviz Rodriguez, Ph.D.
Thesis: "Aboveground carbon in Eucalyptus spp. plantations - at tree level by destructive sampling and for whole stands after adjusting LiDAR metrics"

University of São Paulo – "Luiz de Queiroz" college of Agriculture –ESALQ **2007- 2011**
BS, Forest Engineering

Federal Institute of Santa Catarina- Brazil **2004- 2007**
Agricultural Technician

ACADEMIC EXPERIENCE & EMPLOYMENT

Assistant Professor of Quantitative Forest Science **April 2021 – present**
UF IFAS School of Forest, Fisheries, and Geomatics Sciences SFFGS
University of Florida - UF

Courtesy Assistant Professor of Quantitative Forest Science **Jan. 2020 – April 2021**
School of Forest, Fisheries and Geomatics Sciences - SFFGS
University of Florida - UF

University of Maryland/NASA Goddard Space Flight Center **May 2018 – April 2021**
Postdoctoral Research Fellow
Projects: i) NASA-CMS: Future Mission Fusion for High Biomass Forest Carbon Accounting
ii) Mapping boreal forest biomass density for the ABoVE domain circa 2020 with ICESat-2

USDA Forest Service - Rocky Mountain Research Station (RMRS) **Aug. 2017 – April 2018**
Research group of Dr. Andrew T. Hudak.
Project: RxCADRE - Data set for fuels, fire behavior, smoke, and fire effects model development and evaluation

University of Idaho (UI) **Aug. 2017 – April 2018**
Research group of Dr. Jan Heitel and Dr. Lee Vierling.
Project: NASA-ABoVE- LiDAR, passive spectral, and ecophysiological approaches to link Forest Tundra Ecotone structure and function

NASA - Jet Propulsion Laboratory (JPL) **Aug. 2016 – July. 2017**
Research group of Dr. Sassan Saatchi.
Project: Year-Round Internship Program and AfriSAR

NASA - Jet Propulsion Laboratory (JPL) **Feb. 2016 – April. 2016**
Research group of Dr. Sassan Saatchi.
Project: AfriSAR

USDA Forest Service - Rocky Mountain Research Station (RMRS) **Aug. 2013 – Feb 2016**
Research group of Dr. Andrew T. Hudak.
Project: RxCADRE - Data set for fuels, fire behavior, smoke, and fire effects model development and evaluation

USDA Forest Service - Rocky Mountain Research Station (RMRS) **Aug. 2012 – Dec. 2012**
Research group of Dr. Andrew T. Hudak.
Project: RxCADRE - Data set for fuels, fire behavior, smoke, and fire effects model development and evaluation

Institute of Research and Forest Studies (IPEF) **Aug. 2010 – Dec. 2012**
Thematic Program of Silviculture and Management (PTSM)

RESEARCH PROJECTS – 2019- present (>US$ 9M)

	Role	Years
1. EMS4D: multi-scale fuel mapping and decision support system for next generation of fire management. **Joint Fire Science Program (JFSP)**. US$490k	**PI**	**2021-2025**
2. RapidFEM4D: A web-based mapping platform for rapidly assessing the impacts and near-term recovery of Hurricane Ian on forest ecosystems in Florida. **USDA - The National Institute of Food and Agriculture (NIFA).** US$ 300k	**PI**	**2023-2024**
3. Tree crown mapping from point cloud data for 3D fuel characterization. **USDA Forest Service -** US$ 100k	**PI**	**2021-2023**

4. FuelsCraft: An innovative wildland fuel mapping tool for prescribed fire decision support on Department of Defense military installations. **Environmental Security Technology Certification Program (ESTCP).** US$ 1.7M. PI – Dr. Susan Prichard – University of Washington	**Co-I**	**2023-2026**
5. 3D fuel characterization for evaluating physics-based fire behavior, fire effects, and smoke models on US Department of Defense military lands. **Strategic Environmental Research and Development Program (SERDP).** US$ 2.6M. PI – Dr. Roger Ottmar - US Forest Service, Pacific Northwest Research Station	**Co-I**	**2020-2024**
6. Object-based aggregation of fuel structures, physics-based fire behavior and self-organizing smoke plumes for improved fuel, fire, and smoke management on military lands. **Strategic Environmental Research and Development Program (SERDP).** US$ 2.4M - PI Dr. Andrew Hudak – US Forest Service – Rocky Mountain Research Station.	**Co-I**	**2020-2024**
7. Forest-Level Examination of Silviculture Effects on Ecosystem Services (ForESEES) through the integration of Remote Sensing with Field Experiments**. University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS).** $57,690. PI- Jason Vogel - University of Florida.	**Co-I**	**2022-2022**
8. An integrated bioeconomic model for wildfire risk, surrounding forest management and tradeoffs of ecosystem services in the Deluca Preserve. **University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS).** $78,247. PI- Andres Susaeta – Oregon State University (OSU)	**Co-I**	**2022-2022**
9. Resolving the multi-scale drivers of tree mortality from field and remote sensing data on co-located ForestGEO-NEON. **National Science Foundation (NSF)**. $1.0M. PI- Daniel J. Johnson - University of Florida.	**Co-I**	**2021-2026**
10. Advanced Remote Sensing for Forest Restoration: Quantifying biodiversity, productivity, and resilience under a changing environment. **USDA Forest Service**. US$211k. PIs - Qinfeng Guo (SRS, EFETAC) and Jeff W. Atkins (SRS, Savannah River).	**Co-I**	**2021-2023**
11. AMAZECO: Covering the Amazon with an Ecosystem Structure EBV product combining satellite and airborne lidar. **Microsoft/GEO BON**. €100k. PI Dr. Valbuena - Swedish University of Agricultural Sciences.	**Co-I**	**2021-2021**
12. Mapping boreal forest biomass density for the ABoVE domain circa 2020 with ICESat-2. **NASA- Above.** PI- Dr. Laura Duncanson- University of Maryland, USA.	**Postdoc Fellow/ Collaborator**	**2020-2021**
13. Mapping fuel load and simulation of fire behavior and spread in the Cerrado biome using modeling and remote sensing technologies. **Brazilian National Council for Scientific and Technological Development (CNPq).** US$ 45K. PI- Dr. Carine Klauberg - Federal University of Sao Joao Del-Rei, Brazil	**Co-I**	**2019-2021**
14. Future Mission Fusion for High Biomass Forest Carbon Accounting (Dr. Silva was a postdoc fellow). **NASA Carbon Monitoring System (CMS)**. PIs- Laura Duncanson- University of Maryland, USA.and Lola E. Fatoyinbo Agueh - Biosciences Laboratory, NASA Goddard Space Flight Center, Greenbelt, MD 20707, USA;	**Postdoc Fellow**	**2018-2020**

RESEARCH PROPOSALS (*IN REVIEW*)

	Role	Years
1. CMS4D: A Multi-Scale Data-Fusion Prototype System for the Next Generation of Carbon Dynamics Monitoring From Space: A Case Study in the Brazilian Cerrado – Fire and Fuel in a Biodiversity Hotspot. **NASA Carbon Monitoring System (CMS)**. US$638k. PI Dr. Silva – University of Florida	**PI**	**2023-2026**
2. ICESat-4D: Monitoring Forest Resistance and Post-Hurricane Recovery Dynamics in Southern Forests by the Synergism of ICESat-2, SAR, and Optical Data and an Ecosystem Demography Model. **NASA Studies with ICESat-2**. US$ 492k. PI Dr. Silva – University of Florida	**PI**	**2023-2026**
3. A Phase 3 CMS that disaggregates forest biomass estimates in response to stakeholder needs: Seeing the forest for the trees. **NASA Carbon Monitoring System (CMS)**. US$998k. PI Dr. Andrew Hudak – US Forest Service – Rocky Mountain Research Station.	**Co-PI**	**2023-2026**
4. Collaborative Research: Frameworks: OpenForest4D - A web-based cyberinfrastructure platform for next generation 4D forest mapping and monitoring. **National Science Foundation (NSF)**. US$3.03M. PI Viswanath Nandigam - University of California San Diego	**Co-PI**	**2023-2027**
5. Structurally diverse uneven-aged management system for enhanced multifunctionality and resilience of southern pines. **USDA - The National Institute of Food and Agriculture (NIFA).** US$ 646k. PI Ajay Sharma – University of Florida.	**Co-PI**	**2023-2026**

PEER REVIEWED PUBLICATIONS (>108)

In review

1. **Silva, C.A.,** Duncansona, L., Hancockb, S., Neuenshwanderc, A., Thomasd, N., Hofton, M., Fatoyinboa, L., Simardd, M., Armston, J., Feng, Tuo, Montesano, P., Saatchi, S., Kellner, J., Fatoyinbo, L. Mapping Tropical Forest Aboveground Biomass Density from Synergism of GEDI, ICESat-2, and NISAR data. **Remote Sensing of Environment**. *In review*.
2. Crockett, E. T.H., Atkins, J. W., Guo, Q., Sun, G., Potter, K. M., Ollinger, S., **Silva, C.A.,** Tang, H.A., Woodall, C. W., Holgerson, J., Xiao, J., Structural and species diversity are associated with aboveground carbon storage in forests across the United States: evidence from GEDI and forest inventory data. **Remote Sensing of Environment**. *In review.*
3. Jensen,J., Boelman, N., Eitel,J., Vierling,L., Maguire,A., Oelkers, R., **Silva,C.A.,** Andreu-Hayles,L., D'Arrigo,R., Griffin,K.L. Growth increases but regeneration declines in response to warming and drying at Arctic treeline in white spruce (*Picea glauca*). **Global Change Biology**. *In review*
4. Benito, P.R., **Silva, C.A.,** García, M. Canopy Gap patterns in Mediterranean forests: a spatio-temporal characterization using airborne LiDAR data. **Agricultural and Forest Meteorology**.*In review*
5. Sánchez-López, N., Hudak, A.T., Boschetti, L., **Silva, C.A**., Robertson, K., Loudermilk, E.L., Bright, B.C., Callaham, M.A., Taylor, M.K., In review. A spatially explicit model of tree leaf litter accumulation in fire maintained longleaf pine forests of the southeastern USA. Ecological Modelling. *In review*

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1. Heinrich, V. H. A., Vancutsem, C., Dalagnol, R., Rosan, T. M., Fawcett, D., Silva-Junior, C. H. L., Cassol, H. L. G., Achard, F., Jucker, T., **Silva, C. A.,** House, Jo., Sitch, S., Hales, T., Aragão, Luiz E. O. C. The carbon sink of secondary and degraded humid tropical forests. **Nature** 615, 436–442 (2023). https://doi.org/10.1038/s41586-022-05679-w
2. Scheeres, J.ç Jong, J.J.ç Brede, B., Brancalion, P., Broadbent, E. ; Zambrano, A. M.; Gorgens, E. B.; **Silva, C. A.;** Valbuena, R.; Molin, P.; Stark, S.; Rodrigues, R.; Sandoro, G.; Resende, A.; Almeida, C. T.; Almeida, D. R. A. Distinguishing forest types in restored tropical landscapes with UAV-borne LiDAR. **Remote Sensing of Environment**. In press.
3. Cardil, A., Rodrigues, M., Tapia, M., Barbero, R., Ramírez, J., Stoof, C.R., **Silva, C.A.,** Mohan M., de-Miguel, S. Climate teleconnections modulate global burned area. **Nature Communication** 14, 427 (2023). https://doi.org/10.1038/s41467-023-36052-8
4. Klauberg, C.; Vogel, J.; Dalagnol, R.; Ferreira, M.P.; Hamamura, C.; Broadbent, E.; **Silva, C.A**. Post-Hurricane Damage Severity Classification at the Individual Tree Level Using Terrestrial Laser Scanning and Deep Learning. **Remote Sens**. 2023, 15, 1165. https://doi.org/10.3390/rs15041165
5. Rocha, K.D.; **Silva, C.A.;** Cosenza, D.N.; Mohan, M.; Klauberg, C.; Schlickmann, M.B.; Xia, J.; Leite, R.V.; Almeida, D.R.A.d.; Atkins, J.W.; Cardil, A.; Rowell, E.; Parsons, R.; Sánchez-López, N.; Prichard, S.J.; Hudak, A.T. Crown-Level Structure and Fuel Load Characterization from Airborne and Terrestrial Laser Scanning in a Longleaf Pine (Pinus palustris Mill.) Forest Ecosystem. Remote Sens. 2023, 15, 1002. https://doi.org/10.3390/rs15041002
6. Atkins, J. W., Costanza, J., Dahlin, K. M., Dannenberg, M. P., Elmore, A. J., Fitzpatrick, M. C., Hakkenberg, C. R., Hardiman, B. S., Kamoske, A., LaRue, E. A., **Silva, C. A**., Stovall, A. E. L., & Tielens, E. K. (2023). Scale dependency of lidar-derived forest structural diversity. Methods in Ecology and Evolution, 14, 708– 723. https://doi.org/10.1111/2041-210X.14040

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7. Liang, J., Gamarra, J.G.P., Picard, N., **Silva, C.** et al. Co-limitation towards lower latitudes shapes global forest diversity gradients. **Nature Ecology and Evolution** 6, 1423–1437 (2022). https://doi.org/10.1038/s41559-022-01831-x
8. Leite, R. V., **Silva, C.A.,** Amaral, C. H., Liebenberg, V., Almeida, D. R. A., Midhun, M. et al. Large scale multi-layer fuel load characterization in tropical savanna using GEDI spaceborne lidar data. **Remote Sensing of Environment.** 268, Jan 2022, 112764. https://doi.org/10.1016/j.rse.2021.112764
9. Duncanson, L.; Kellner, J. R. et. al. Aboveground biomass density models for NASA's Global Ecosystem Dynamics Investigation (GEDI) lidar mission, **Remote Sensing of Environment**, Volume 270,2022,112845 https://doi.org/10.1016/j.rse.2021.112845.
10. Haneda, L. Brancalion, P. H. S., Molin, P.G., Ferreira, M.P., **Silva,C.A.,** Almeida, C.T., Resende, A.F., Santoro, G.B., Rosa, M., Guillemot, J., Maire, G.L., Feret, J.B., Almeida, D.R.A.. Forest landscape restoration: Spectral behavior and diversity of tropical tree cover classes, **Remote Sensing Applications: Society and Environment,** 29, 2023. https://doi.org/10.1016/j.rsase.2022.100882
11. Cosenza, D. N.; Vogel, J., Broadbent, E. N, Silva, C.A. 2022. Silvicultural experiment assessment using lidar data collected from an unmanned aerial vehicle, **Forest Ecology and Management** https://doi.org/10.1016/j.foreco.2022.120489.
12. Adrah, E.; Wan Mohd Jaafar, W.S.; Omar, H.; Bajaj, S.; Leite, R.V.; Mazlan, S.M.; **Silva, C.A.;** Chel Gee Ooi, M.; Mohd Said, M.N.; Abdul Maulud, K.N.; Cardil, A.; Mohan, M. Analyzing Canopy Height Patterns and Environmental Landscape Drivers in Tropical Forests Using NASA's GEDI Spaceborne LiDAR. Remote Sens. 2022, 14, 3172. https://doi.org/10.3390/rs14133172
13. **Silva, C.A.;** Hudak, A.T; Vierling, L.A.; Valbuena, R.; Cardil, A.; Mohan, M.; Almeida, D. A.; Broadbent,E.N.; Zambrano,A. M. A.; Wilkinson, B., Sharma,A., Drake,J. B.; Medley,P. B., Vogel, J. G.; Prata,G. A.; Atkins, J.; Hamamura,C.; Klauberg, C. 2021. TreeTop: A Shiny-based

Application for Extracting Forest Information from LiDAR data for Ecologists and Conservationists. **Methods in Ecology and Evolution**. V13, pg1164-1176. https://doi.org/10.1111/2041-210X.13830

14. Valle; D,; **Silva, C.;** Longo, M.; Silverio, D.V.; Maracahipes, L.; Brando, P. Mapping forest degradation using the Latent Dirichlet Allocation model applied to airborne LiDAR data: a case study on the effect of forest fragmentation and fire in the Amazon region. Methods in Ecology and Evolution. 2021, in review. 2022. V. 13, pg 1329-1342 https://doi.org/10.1111/2041-210X.13836
15. Stitt, J.M.; Hudak, A.T.; **Silva, C.A.;** Vierling, L.A.; Vierling, K.T. Evaluating the Use of Lidar to Discern Snag Characteristics Important for Wildlife. **Remote Sens.** 2022, 14, 72. https://doi.org/10.3390/rs14030720
16. Pinagé, E. R., Bell, D., Longo, M., Gao, S., Keller, M., **Silva, C.A.,** Köhler, P., Frankenberg, C., Huet, A. Forest structure and photosynthesis across intact and degraded forests in the Amazon. Remote Sensing of Environment. V. 274. https://doi.org/10.1016/j.rse.2022.112998
17. Atkins, Jeff W.; Stovall, Atticus E.L.; **Silva, C**. 2022. Open-Source tools in R for forestry and forest ecology. Forest Ecology and Management. 503(6): 119813. https://doi.org/10.1016/j.foreco.2021.119813
18. Corte, A.P.D.; da Cunha Neto, E.M.; Rex, F.E.; Souza, D.; Behling, A.; Mohan, M.; Sanquetta, M.N.I.; **Silva, C.A.**; Klauberg, C.; Sanquetta, C.R.; Veras, H.F.P.; de Almeida, D.R.A.; Prata, G.; Zambrano, A.M.A.; Trautenmüller, J.W.; de Moraes, A.; Karasinski, M.A.; Broadbent, E.N. High-Density UAV-LiDAR in an Integrated Crop-Livestock-Forest System: Sampling Forest Inventory or Forest Inventory Based on Individual Tree Detection (ITD). **Drones** 2022, 6, 48. https://doi.org/10.3390/drones6020048
19. Silveira, A. B., Carvalho, S. P. C., Nicoletti, M. N., **Silva, C.A.**, Drescher, R.,Carvalho, M. L. C., Madi, J.P.S., Topanotti, L. R., Zeviani, W. M.,Andrade, V. C. L 2022.Impact of plot size on tropical forest structure and diversity estimation. **Revista de Biología Tropical**. Vol. 70: 437-449 https://doi.org/10.15517/rev.biol.trop.2022.48640
20. Stoddart, J.; de Almeida, D.R.A.; **Silva, C.A.**; Görgens, E.B.; Keller, M.; Valbuena, R. A Conceptual Model for Detecting Small-Scale Forest Disturbances Based on Ecosystem Morphological Traits. **Remote Sens.** 2022, 14, 933. https://doi.org/10.3390/rs14040933
21. Dalla Corte, A.P.; de Vasconcellos, B.N.; Rex, F.E.; Sanquetta, C.R.; Mohan, M.; **Silva, C.A.**.; Klauberg, C.; de Almeida, D.R.A.; Zambrano, A.M.A.; Trautenmüller, J.W.; Leite, R.V.; do Amaral, C.H.; Veras, H.F.P.; Rocha, K.d.S.; de Moraes, A.; Karasinski, M.A.; Sanquetta, M.N.I.; Broadbent, E.N. Applying High-Resolution UAV-LiDAR and Quantitative Structure Modelling for Estimating Tree Attributes in a Crop-Livestock-Forest System. **Land** 2022, 11, 507. https://doi.org/10.3390/land11040507

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22. **Silva, C.A.,** Duncansona, L., Hancockb, S., Neuenshwanderc, A., Thomasd, N., Hofton, M., Fatoyinboa, L., Simardd, M., Armston, J., Dubayah, R. Fusing simulated GEDI, ICESat-2 and NISAR data for regional aboveground biomass mapping. **Remote Sensing of Environment**. 2021. v253. https://doi.org/10.1016/j.rse.2020.112234
23. Silva Junior, C.H.L.; Carvalho, N.S.; Pessôa, A.C.M.; Reis, J.; Pontes-Lopes, A.; Doblas, J.; Heinrich, V.; Campanharo, W.; Alencar, A.; Silva, C.; Lapola, D.; Armenteras, D.; Matricardi, E. A. T.; Berenguer, E.; Cassol, H.; Numata, I.; House, J.; Ferreira, J.; Barlow; J.; Gatti, L.; Brando, P.; Fearnside, P.; Saatchi, S.; Silva, S.; Sitch, S.; Aguiar, A.P.; Silva, C. A.; Vancutsem, C.; Achard, F.; Beuchle, R.; Shimabukuro; Y.; Anderson, L.; Aragão, L, E. O. C. Amazonian forest degradation must be incorporated into the COP26 agenda Integrating . **Nature Geoscience**. 14, 634–635 (2021). https://doi.org/10.1038/s41561-021-00823-z

24. Russell, M.; Eitel, J.U.H.; Link, T.E.; Silva, C.A. Important Airborne Lidar Metrics of Canopy Structure for Estimating Snow Interception. Remote Sens. 2021, 1, 4188. https://doi.org/10.3390/rs13204188
25. Santos, L. H. O., Madi, J. P. S., Díaz, L. M. G. R., Ramirez, G. M., Souza, É. C., Nunes, G. M., Corte, A. P. D., Carvalho, M. P. L. C., **Silva, C. A**., & Carvalho, S. P. C. (2021). Relationship between spectral variables with RapidEye images and dendrometric variables in teak plantations using principal component analysis. **Scientia Forestalis,** 49(132), e3655. https://doi.org/10.18671/scifor.v49n132.09
26. Stitt, J. M.; Hudak, A. T.; Silva, C.A.; Vierling, L.; Vierling, K. Characterizing individual tree-level snags using airborne lidar-derived forest canopy gaps within closed-canopy conifer forests. Methods in Ecology and Evolution. 2021;00:1–12. https://doi.org/10.1111/2041-210X.13752
27. Faria, B. L., Staal, A., Carlos A. Silva, C. A., Martin, P.A., Panday, P.K., Dantas, V. Climate change and deforestation increase the vulnerability of Amazonian forests to post-fire grass invasion. **Global Ecology and Biogeography**. 00:1–14. https://doi.org/10.1111/geb.13388
28. d'Oliveira, M. V. N., Figueiredo, E. O., Almeida; D. R. A., Oliveira; L. C., Silva, C. A., Nelson4, B. W., Cunha, R. M., Papa, D. A., Stark, C. C., Valbuena, R. Impacts of selective logging on Amazon forest canopy structure and biomass with a cost-effective LiDAR and photogrammetric survey sequence. **Forest Ecology and Management**. V 500, 15 Nov 2021, 119648. https://doi.org/10.1016/j.foreco.2021.119648
29. Cardil, A., Monedero, S., Schag, G., de-Miguel, s., Tapia, M., Stoof, C., Silva, c.A., Mohan, M., Cardil, A., Ramirez, J. Fire behavior modeling for operational decision-making. Current Opinion in **Environmental Science & Health**. 2021, 23, 100291l https://doi.org/10.1016/j.coesh.2021.100291
30. Dorado-Roda, I.; Pascual, A.; Godinho, S.; Silva, C.A.; Botequim, B.; Rodríguez-Gonzálvez, P.; González-Ferreiro, E.; Guerra-Hernández, J. Assessing the Accuracy of GEDI Data for Canopy Height and Aboveground Biomass Estimates in Mediterranean Forests. **Remote Sens**. 2021, 13, 2279. https://doi.org/10.3390/rs13122279
31. Almeida, D. R. A.,Broadbent, E. N., Ferreira, M.P., Meli, P., Zambrano, A. M. A., Gorgens, E. B., Resende, F. R., Silva, T. S. F., Almeida, C. T., Amaral8, C. H., Corte, A. P. D.,Silva, C. A., et al. Monitoring restored tropical forest diversity and structure through UAV-borne hyperspectral and lidar fusion. **Remote Sensing of Environment**. 2021, 264, 112582. https://doi.org/10.1016/j.rse.2021.112582
32. Fatoyinbo, L., Armston, J., Simard, M., Saatchi, S., Denbina, M., Lavalle, M., Hofton, M., Tang, H., Marselis, S., Pinto, N., Hancock, S., Hawkins, B., Duncanson, L., Blair, B., Hansen, C., Lou, Y., Dubayah, R., Hensley, S., Silva, C.A., Poulsen, J,. R., Labrière, N., Barbier, N., Jeffery, K., Kenfack, D., Herve M., Bissengou, P., Alfonso A., Moussavou, G., White, L., Lewis, S., Hibbard, K.The NASA AfriSAR Campaign: Airborne SAR and Lidar Measurements of Tropical Forest Structure and Biomass in Support of Future Space Missions. **Remote Sensing of Environment**. 2021,264, 112533. https://doi.org/10.1016/j.rse.2021.112533
33. De Faria, B.L.; Marano, G.; Piponiot, C.; Silva, C.A.; Dantas, V.d.L.; Rattis, L.; Rech, A.R.; Collalti, A. Model-Based Estimation of Amazonian Forests Recovery Time after Drought and Fire Events. **Forests** 2021, 12, 8. https://doi.org/10.3390/f12010008
34. Cardil, A.; de-Miguel, S., Silva, C.A; Reich, P. B., Calkin, D.; Brancalion, P. H. S. 9; et al. Recent deforestation drove the spike in Amazonian fires. **Environ. Res. Lett.** https://doi.org/10.1088/1748-9326/abcac7
35. Costa, M., Silva, C. A.; Broadbent, E. N. et al. 2021. Beyond trees: mapping total aboveground biomass density in the Brazilian savanna using high-density UAV-lidar data. **Forest Ecology and Management.** v. 491: https://doi.org/10.1016/j.foreco.2021.119155

2020

36. Silva Junior, C., Aragão, L., Anderson, L., Fonseca, M., Shimabukuro, Y., Krug, T., Vancutsem, C., Frederic, A., Beuchle, R., Saatchi, S., Silva, I., **Silva, C.A**., Maeda, E., Longo, M., Persistent collapse of biomass in Amazonian forest edges following deforestation leads to unaccounted carbon losses. **Science Advances**. 2020. Vol. 6, no. 40, doi: 10.1126/sciadv.aaz8360
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- **Silva, C.A.;** Klauberg, C., Mohan, M.; Bright, B. LiDAR Analysis in R and rLiDAR for Forestry Applications. P. 85. 2018.
- Corte, D. A. P.; Broadbent, E. N,; Samtps. L. H., Karasinski, M. A.; Sanqueta, C. R.; Prata, G. A.; Almeida, D. R. A.; **Silva, C.** A.; Aplicações do lidar para o inventário florestal – enfoque unidade de área. https://doi.org/10.22533/at.ed.223222904

PUBLISHED CONFERENCE PROCEEDINGS

1. Cardil, A.; Monedero, S.; Navarrete, M. A.; de-Miguel, S.; **Silva, C. A.;** Quilez, R.; Purdy, S.; Ramirez, J. 2022. Validation of operational fire spread models in California. IX International

Conference on Forest Fire Research. D. X. Viegas (Ed.)

2. Sánchez-López, N.; Hudak; T. A.; Boschetti, L.; **Silva, C. A.;** Bright, B. C.; Loudermilk, E. L. 2022. A spatially explicit model of litter accumulation in fire maintained longleaf pine forest ecosystems of the Southeastern USA. IX International Conference on Forest Fire Research. D. X. Viegas (Ed.)
3. Leite, R. V.; **Silva, C. A.** et al. Predicting total fuel load in tropical savanna using NASA's GEDI spaceborne lidar and machine learning (2021). Silvilaser 2021. Sep 28-30, 2021. Proceedings of the SilviLaser Conference 2021. (2021). In M. Hollaus & N. Pfeifer (Eds.), Geowissenschaftliche Mitteilungen (Vol. 104). Technische Universität Wien (TU Wien), Department of Geodesy and Geoinformation. https://doi.org/10.34726/wim.1861
4. Rahman, A,; Jaafar, W. S.; Maulud, N. A. Silva, C. A.; Cardil, A. Applications of Drones in Emerging Economies: A Case Study of Malaysia. 2019 6th International Conference on Space Science and Communication (IconSpace 2019); https://www.proceedings.com/content/051/051312webtoc.pdf
5. Rex, F., Corte, A., Klauberg, C., **Silva. C.A** et al 2019. Estimating Above-Ground Biomass in Araucaria Angustifolia At Tree Level Using Airborne Lidar Data. - XVII Brazilian Symposium on Remote Sensing.
6. **Silva, C.A,** Duncanson, L. et al 2019. Estimating Forest Attributes in Industrial *Pinus taeda* L. Forest Plantations In Brazil Using Simulated Nasa's GEDI Spaceborne Lidar Data. XVII Brazilian Symposium on Remote Sensing.
7. Mohan, M., **Silva, C.A.,** Klauberg, C., Cardil, A. 2019. Applying Mixed-Effects Model For Estimating Individual Tree Attributes in *Eucalyptus* spp. Forest Plantations From Field And Airborne Lidar Data. - XVII Brazilian Symposium on Remote Sensing.
8. Almeida, D.R., Broadbent, E., Zambrano, A., Startk, C., Papa, D., Gorgens, E.B., **Silva, C.A.,** Brancalion, P. 2019. Monitoramento da Estrutura De Plantios De Restauração Florestal Estabelecidos Sob Diferentes Intensidades De Manejo Usando Drone-Lidar. XVII Brazilian Symposium on Remote Sensing.
9. Rex, F., Corte, A., Klauberg, C., **Silva. C.A.** 2019. Comparison Between Random Forest and Linear Regression For Tropical Forest Aboveground Biomass Estimation. XVII Brazilian Symposium on Remote Sensing.
10. Mohan, M., Araujo B., **Silva, C.,** Klauberg, C.A. 2019. Combining Airborne Laser Scanning and Local Maxima Algorithm For Individual Tree Detection In Coconut (Cocos Nucifera L.) Forest Plantations. XVII Brazilian Symposium on Remote Sensing.
11. Vasconcellos, B., Hentz, A, Corte, A., **Silva, C.,** Hudak, A. 2019. Estimation Of Leaf Area Index In A Mixed Ombrophilous Forest Using Remote Sensing Data - XVII Brazilian Symposium on Remote Sensing.
12. Silva, V., **Silva, C.,** Silva, E., Dias, I. 2019. Effects of Modeling Methods And Sample Size For Lidar-Derived Basal Area Estimation In Eucalyptus Forest - XVII Brazilian Symposium on Remote Sensing.
13. **Silva, C.A.,** Hudak,A., Klauberg, C., Rowell, E. 2019. Estimation Of Terrestrial Vs Airborne Lidar-Derived Crown Attributes In Longleaf Pine Forest At Eglin Air Force Base, Florida, USA . IGARSS 2019.
14. Klauberg, C., Hudak, A., **Silva, C.A.** et al. 2019 Applying Lidar And Quickbird Data For Crown Severity Classification At Tree Level In Conifer Forest. IGARSS 2019.
15. **Silva, C.A.**; Hudak, A.; Crookston, N.L.; Klauberg, C.; Liesenberg, V. Detecting Individual Trees using a WEB-LIDAR Forest Inventory Application. Part 1: The Treetop Tool. In: XI Seminário de Atualização em Sensoriamento Remoto e Sistemas de Informações Geográficas Aplicados à Engenharia Florestal, Curitiba. v.1. p.300 – 306. 2014.
16. **Silva, C.A.**; Hudak, A.; Crookston, N.L.; Klauberg, C.; Liesenberg, V. Extracting individual trees and LiDAR metrics using a Web-LiDAR forest inventory application. part 3: The 3D ClusterTree tool. In: XI Seminário de Atualização em Sensoriamento Remoto e Sistemas de Informações

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17. **Silva, C.A.**; Hudak, A.; Crookston, N.L.; Klauberg, C.; Liesenberg, V. Visualizing and Generating LiDAR Metrics using a Web-LiDAR Forest Inventory Application. Part 2: The LASMetrics Tool In: XI Seminário de Atualização em Sensoriamento Remoto e Sistemas de Informações Geográficas Aplicados à Engenharia Florestal, v.1. p.768 – 774. 2014.
18. **Silva, C.A.**; Klauberg, C.; Hudak, A.; Liebermann, R.; Carvalho, S.P.C.E.; Rodriguez, L. C. E. Aplicando filtro local máximo (LM) através dos métodos da janela fixa e variável em dados LIDAR para identificação de árvores individuais em um povoamentos de *Eucalyptus* sp. In: XVI SBSR Simpósio Brasileiro de Sensoriamento Remoto, SBSR, Foz do Iguaçu. p.6081 – 6088. 2013.
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20. **Silva, C.A.**; Klauberg, C.; Carvalho, S.P.C.E.; Hudak, A.; Rodriguez, L.C.E. Discrete-return LiDAR data and model development to predict aboveground carbon stocks in *Eucalyptus* spp. plantations in Brazil. In: SilvilLaser, 2013, Beijing, China. Proceedings of SilviLaser 2013.
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22. **Silva, C.A.**; Liesenberg, V.; Klauberg, C.; Hudak, A.; Liebermann, R.; Rodriguez, L.C.E. Influência da interpolação na geração de MDTs a partir de pontos classificados LiDAR. In: Anais XVI Simpósio Brasileiro de Sensoriamento Remoto - SBSR., Foz do Iguaçu. p.6105 – 6112, 2013.
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27. Gorgens, E. ; Rodriguez, L. E ; Silva, A. G. P. ; Coops, N. ; **Silva, C.A**. Influence of LiDAR data projection in DTM generation. In: Silvilaser, 2012, Vancouver. Silvilaser, 2012.
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32. **Silva, C.A**; Klauberg, C. ; Berri, P. V. ; Vidal. E. J. Ecologia da espécie Drimys brasiliensis Miers. (Winteraceae) em um remanescente de Floresta Ombrófila Mista, Serra da Farofa, Painel, SC, Brasil.. In: X Congresso de Ecologia do Brasil, 2011, São Loureço. X Congresso de Ecologia do Brasil, 2011.
33. **Silva, C.A**; Klauberg, C. ; Berri, P. V. ; Vidal. E. J. Estrutura populacional de Myrcia glabra (O.Berg) D. Legrand. (Myrtaceae) em um trecho em um remanescente de Floresta Ombrófila Mista, no interior do estado de Santa Catarina, Brasil. In: X Congresso de Ecologia do Brasil, 2011, São Lourenço - MG. X Congresso de Ecologia do Brasil, 2011.
34. Klauberg, C. ; Vidal. E. J ; Ducatti, M. ; **Silva, C.A.** Produção de óleo de copaíba (Copaifera sp.) em Floresta Amazônica ? Paragominas, PA.. In: X Congresso de Ecologia do Brasil, 2011, São Lourenço - MG. X Congresso de Ecologia do Brasil, 2011.
35. Klauberg, C. ; Vidal. E. J ; R, C. ; **Silva, C.A ;** Lentini, M. Amostragem de um produto florestal não madeireiro: cipó-titica (Heteropsis sp.), na região Amazônica. In: X Congresso de Ecologia do Brasil, 2011, São Lourenço - MG. X Congresso de Ecologia do Brasil, 2011.
36. Grasmann, G. S. ; **Silva, C.A** ; Klauberg, C. ; Berri, P. V. ; Vidal. E. J. Composição e diversidade de avifauna em remanescente de Floresta Ombrófila Densa Montana em um trecho da rodovia Rodoanel Mário Covas, em Itapecerica da Serra, SP, Brasil.. In: X Congresso de Ecologia do Brasil, 2011, São Lourenço - MG. X Congresso de Ecologia do Brasil, 2011.
37. **Silva, C.A;** Klauberg, C. ; Berri, P. V. ; Vidal. E. J. Ecologia da espécie Weinmannia paulliniifolia Pohl ex Ser. (Cunoniaceae) em um remanescente de Floresta Ombrófila Mista, Serra da Farofa, Painel, SC, Brasil.. In: X Congresso de Ecologia do Brasil, 2011, São Lourenço - MG. X Congresso de Ecologia do Brasil, 2011.
38. **Silva, C.A**; Goncalves, J. L. M. ; Pizzi, M. ; Arthur Junior, J. C. Volatilização da amônia em plantios de eucalipto fertilizados com uréia. In: SIICUSP - Simpósio Internacional de Iniciação Científica da USP, 2010, Piracicaba-SP. SIICUSP - Simpósio Internacional de Iniciação Científica da USP, 2010.
39. Klauberg, C. ; **Silva, C.A** ; Higuchi, P. ; Silva, A.C. Fitossociologia de um remanescente de Floresta Ombrófila Mista Alto-Montana na Serra da Farofa, município de Painel SC.. ,. In: IX Congresso de Ecologia do Brasil, 2009, São Lourenço, MG., 2009, São Lourenço, MG. Fitossociologia de um remanescente de Floresta Ombrófila Mista Alto-Montana na Serra da Farofa, município de Painel SC.. In: IX Congresso de Ecologia do Brasil, 2009, São Lourenço, MG. IX Congresso de Ecologia do Brasil, 2009., 2009.
40. Klauberg, C. ; **Silva, C.A**. Ecologia da espécie Araucaria angustifolia (Bertol.) Kuntze (Araucariaceae) em um remanescente de Floresta Ombrófila Mista Alto-Montana, Serra da Farofa, Painel, SC, Brasil. In: IX Congresso de Ecologia do Brasil, 2009, São Lourenço, MG, 2009, São Lourenço -MG. IX Congresso de Ecologia do Brasil - Ecologia e o Futuro da Biosfera, 2009., 2009.
41. **Silva, C.A**; Klauberg, C. ; Costa, N.C.F ; Silva, A.C. ; Higuchi, P. Ecologia da espécie Allophylus edulis (St.-Hil.) Radlk. (Sapindaceae) em um remanescente de Floresta Ombrófila Mista Montana, Campos Novos, SC, Brasil. In: IX Congresso de Ecologia do Brasil - Ecologia e o Futuro da Biosfera, 2009., 2009, São Lourenço -MG. Ecologia da espécie Allophylus edulis (St.-Hil.) Radlk. (Sapindaceae) em um remanescente de Floresta Ombrófila Mista Montana, Campos Novos, SC, Brasil, 2009.

PUBLISHED CONFERENCE ABSTRACTS

42. Stoddart, J.; de Almeida, D.R.A.; **Silva, C.A.;** Görgens, E.B.; Keller, M.; Valbuena, R. A. 2022. Detecting small-scale forest disturbance with LiDAR derived ecosystem morphological traits. Ecological Society of America. (accepted)

43. Mohan et al. 2021. Leatherback turtle conservation and monitoring efforts at the crossroads: A remote sensing perspective. 2021 7th International Conference on Space Science and Communication (IconSpace). https://doi.org/10.1109/IconSpace53224.2021.9768727
44. Duncanson, L.; Neuenschwander, A. **Silva,C. A.;** Montesano, P.; Guenther, E.; Thomas, N.; Hancock, S.; Minor, D.; White, J.; Wulder, M.; Armston, J. Forest Aboveground Biomass Estimation with GEDI and ICESat-2 in boreal forests. IGARSS 2021 - 2021 IEEE International Geoscience and Remote Sensing Symposium.
45. Russell, M.; Eitel, J.U.H.; Link, T.E.; Silva, C.A. 2021. Important airborne lidar metrics of canopy structure for estimating snow interception. AGU Fall meeting 2021.
46. Leite, R. V.; **Silva, C. A.** et al. Advanced methods for large scale multi-layer fuel load characterization in forest and savanna ecosystems using NASA's GEDI spaceborne lidar system (2021). 9th International Fire Ecology and Management Congress. Nov 30 – Dec 03, 2021
47. Almeida, D., Zambrano, A., Wilkinson, B., **Silva, C. A.,** Papa, D., Broadbent, E., Gorgens, E., Ferreira, M., Meli, P., Brancalion, P., Chazdon, R., Valbuena, R., Stark, S. Monitoring the structure of forest restoration plantations with a drone-lidar system. Monitoring forest restoration plantations with a drone-lidar system. XXV IUFRO Congress 2019.
48. **Silva, C.A.,** Duncansona, L., Hancockb, S., Neuenshwanderc, A., Thomasd, N., Hofton, M., Fatoyinboa, L., Simardd, M., Armston, J., Dubayah, R. Fusing GEDI, ICESat-2 and NISAR data for aboveground biomass mapping in Sonoma County, California, USA. AGU Fall meeting 2018.
49. **Silva, C. A**.; Hudak, A.; Vierling, L. A.; Klauberg, C.; Kato, A. ; Cardil, A.; Weiskittel, A. Estimating individual tree aboveground carbon in a fast-growing Eucalyptus spp. forest plantation from airborne lidar data using a mixed-effects model. Silvilaser, Blacksburg, Virginia, USA. 2017.
50. Kato, A.; Osawa, A.; Hudak, A.; **Silva, C. A**.; Moskal, L. Monika. Fractal Dimension of Trees using Terrestrial Laser Scanner. Silvilaser, Blacksburg, Virginia, USA. 2017.
51. Hudak, A.; Bright, B.; Pokswinski, S.; Loudermilk, E. L.; O'Brien, J.; Klauberg, C.; **Silva, C.A**. Longleaf pine overstory structure constraints fine-scale dynamics in fuels, fire, and plant species diversity. In: Ecological Society of America - ESA - Annual Meeting (Portland, USA). 2017.
52. **Silva, C.A**; Hudak, A.; Rowell, E.; Seielstad, C.; Klauberg, C.; Bright, B.; Loudermilk, E. L. ; O'Brien, J. J. Comparison of terrestrial and airborne LiDAR derived crown metrics for describing forest structure at Eglin Air Force Base, Florida, USA. In: Ecological Society of America - ESA - Annual Meeting (Portland, USA). 2017.
53. **Silva, C. A**.; Hudak, A.; Vierling, L. A. ; Klauberg, C. ; Ferraz, A. ; Alonso, M. G. ; Keller, M. ; Saatchi, S. Influence of the airborne lidar pulse density on biomass change prediction in tropical forest. 2016 AGU Fall Meeting, 2016.
54. **Silva, C. A**.; Hudak, A.; Vierling, L. A. ; Klauberg, C. ; Ferraz, A. ; Alonso, M. G. ; Keller, M. ; Saatchi, S. Modeling aboveground biomass from individual tree LiDAR-derived metrics in tropical forest. In: ForestSAT, 2016, Santiago. ForestSAT 2016, 2016.
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57. Hudak, A.; Bright, B. C. ; Loudermilk, E. L. ; O,Brien, J. J. ; **Silva, C.A** ; Vierling, L. A. Upscaling tree density measures from environmental monitoring plots across Eglin Air Force Base using low density lidar. In: 36 Canadian Symposium on Remote Sensing, 2015, St. John's, Newfoundland and L. Abstracts:36 Canadian Symposium on Remote Sensing, 2015. v. 1. p. 110.
58. **Silva, C.A**; Hudak, A. ; Vierling, L. A. ; Loudermilk, E. L. ; O?Brien, J. J. Web-based applications

for LiDAR data processing and visualizing trees at the plot level. In: 36 Canadian Symposium on Remote Sensing, 2015, St. John's, Newfoundland and L. Abstracts: 36 Canadian Symposium on Remote Sensing, 2015. v. 1. p. 172.

59. Hudak, A. ; **Silva, C.A** ; Bright, B. C. ; Loudermilk, E. L. ; Kato, A. ; O'Brien, J. J. ; Vierling, L. A. Lidar tools and techniques for 3D vegetation structure characterization at multiple scales. In: 23rd Center for Environmental Remote Sensing International Symposium, 2015, Matsudo. 23rd Center for Environmental Remote Sensing International Symposium, 2015.
60. **Silva, C.A**; Hudak, A. ; Vierling, L. A. ; Keller, M. ; Klauberg, C. Aboveground Biomass Modeling from Field and LiDAR Data in Brazilian Amazon Tropical Rain Forest. In: 2015 AGU Fall Meeting, 2015, San Francisco. 2015 AGU Fall Meeting, 2015.
61. Falkowski, M.; Fekety, P. ; **Silva, C.A** ; Hudak, A. Increasing the Efficiency of LiDAR Based Forest Inventories: A Novel Approach for Integrating Variable Radius Inventory Plots with LiDAR Data. In: 2015 AGU Fall Meeting, 2015, San Francisco. 2015 AGU Fall Meeting, 2015.
62. Carvalho, S. P. C. ; Lima, M. P. ; **Silva, C.A** ; Sena, A. L. M. . Individual Tree Detection In Monoclonal Eucalyptus Plantations In Brazil. In: WFC 2015 XIV World Forestry Congress, 2015, Durban. Technical posters, 2015.
63. **Silva, C.A.**; Klauberg, C.; Hudak, A.; Almeida, D.R.A. Extração de árvores individuais em dados LiDAR usando o aplicativo de inventário florestal WEB-LiDAR 3D ClusterTree. In: III simpósio nacional de inventário florestal. Anais do III simpósio nacional de inventário florestal. Manaus, v.1. p.125 – 125. 2014.
64. **Silva, C.A.**; Klauberg, C.; Hudak, A.; Almeida, D.R.A. Individual tree detection using Web-LiDAR treetop forest inventory application. In: In: III simpósio nacional de inventário florestal. Anais do III simpósio nacional de inventário florestal. Manaus. v.1. p.124 – 125. 2014.

TALKS AND PRESENTATIONS (2015 – present)

1.	Mapping fuel load and simulation of fire behaviour and spread in the Cerrado biome using modeling and remote sensing technologies. PrevFogo – IBAMA - Brazil	**2022**
2.	Seeing the forest in 3D with lasers. Florida Forestry Association Annual Meeting	**2022**
3.	Overview of UF Forest Biometrics and Remote Sensing Lab. Rayonier	**2022**
4.	Forest structure monitoring using lidar data. Guest speaker for FOR 3153C Forest Ecology – UF/IFAS	**2022**
5.	Large scale fuel load characterization in tropical savanna using multi-source remote sensing data. Northern Arizona University, School of Forestry.	**2022**
6.	Seeing the forest with lasers. Jones Center at Ichauway	**2022**
7.	Advanced methods for 3-D forest characterization and mapping from lidar remote sensing data. Forest Biology Research Cooperative (FBRC) annual meeting	**2021**
8.	Large scale multi-layer fuel load characterization in tropical savanna using GEDI spaceborne lidar data. 2021 7th International Conference on Space Science and Communication	**2021**
9.	Caracterização e modelagem do material combustível no bioma Cerrado utilizando dados GEDI e UAV-Lidar. GISForest Conference. Brazil.	**2021**
10.	Lidar phenotyping. Cooperative Forest Genetics Research Program (CFGRP) annual meeting	**2021**
11.	Large scale multi-layer fuel load characterization in tropical savanna using GEDI spaceborne lidar data. UFMT – Brazil.	**2021**
12.	Applying Mixed-Effects Model For Estimating Individual Tree Attributes in *Eucalyptus* spp. Forest Plantations From Field And Airborne Lidar Data - XVII Brazilian Symposium on Remote Sensing	**2019**

13. Estimating Forest Attributes In Industrial *Pinus taeda* L. Forest Plantations in Brazil Using Simulated Nasa's Gedi Spaceborne Lidar Data - XVII Brazilian Symposium on Remote Sensing **2019**
14. Introdução a tecnologia LiDAR aplicada a Engenharia Florestal- Federal University of São João del-Rei **2019**
15. Predição do volume total e de sortimentos de fustes em plantações de Pinus taeda L. utilizando dados LiDAR e Random Forest - Federal University of São João del-Rei **2019**
16. Mensuração e inventário florestal em áreas urbanas com geotecnologias - Federal University of São João del-Rei **2019**
17. Impacto da densidade de pulso do LiDAR aerotransportado na estimativa de estoque e mudança da biomassa em uma floresta tropical de corte seletivo - Federal University of São João del-Rei **2019**
18. Combinando métricas de copa derivadas do LiDAR aerotransportado e terrestre para descrição da estrutura florestal - Federal University of São João del-Rei **2019**
19. Silvilaser (Blacksburg, USA) – Silva et al. "Estimating individual tree aboveground carbon in a fast-growing Eucalyptus spp. forest plantation from airborne lidar data using a mixed-effects model". (Presented by Dr. Akira Kato) **2018**
20. Ecological Society of America - ESA - Annual Meeting (Portland, USA) - Silva et al. "Comparison of terrestrial and airborne LiDAR derived crown metrics for describing forest structure at Eglin Air Force Base, Florida, USA" **2017**
21. ForestSAT 2016 (Santiago, Chile) Silva, C. A. et al. "Modeling aboveground Biomass from individual tree LiDAR-derived metrics in tropical forest". **2016**
22. American Geophysical Union, Fall General Assembly – AGU 2016 (San Francisco, USA) – Silva et al. "Influence of the airborne lidar pulse density on biomass change prediction in tropical forest" **2016**
23. LiDAR Remote Sensing for Forestry applications - Federal University of Mato Grosso **2016**
24. Geospatial Technologies in Precision Agriculture - Federal University of Mato Grosso **2016**
25. 36th Canadian Symposium on Remote Sensing (Newfoundland, Canada). Silva et al. "Individual tree detection from LiDAR-derived canopy height models (CHM) in longleaf pine forest" **2015**

TEACHING EXPERIENCE

- FOR3034C – Forest Mensuration – University of Florida/ IFAS **2022**
- Mini-course: Introduction to rGEDI: An R Package for NASA's Global Ecosystem Dynamics Investigation (GEDI) Data Visualization and Processing (GEDI) Lidar. **SBSR Interim 2021.** **2021**
- Mini-course: Introduction to Global Ecosystem Dynamics Investigation Lidar. XIX **Brazilian Symposium on Remote Sensing.** **2019**
- Adjunct lecturer: NRS 404/504 - Lidar Remote Sensing for Environmental Monitoring – University of Idaho – College of Natural Resources – Department of Natural Resources and Society (https://www.webpages.uidaho.edu/ecologyonline/documents/NRS404_504_Syllabus_180326.pdf) **2018/Summer 2019**
- LiDAR remote sensing application in Forestry - Workshop UFSJ (https://ufsj.edu.br/noticias_ler.php?codigo_noticia=7427)

- Teacher Assistant for Dr. Lee Vierling: "REM/FOR 472 Remote Sensing of the Environment", University of Idaho – College of Natural Resources – Department of Natural Resources and Society **2015**
- Introduction to lidar technology - Workshop. Department of Silviculture - Federal Rural University of Rio de Janeiro (UFRJ) **2016**
- Airborne lidar data processing and analysis - Workshop. Department of Forest Engineering - Federal University of Mato Grosso (UFMT) **2016**

COMMITTEES

- Sharma, A., Silva, C.. Final Examination Committee member for Ethan Baldino. Master of Science Forest Resources and Conservation. University of Florida, 2022.
- Amaral, C. H.; Silva, C. A., Almeida, T. I. R., Filho, E., I., F., Torres, F., T. R., Rodrigo Leite Ph.D. defense. Federal University of Viçosa. 2022.
- Corte, A. P. D.; Klauberg. C.; Silva, C. A. Franciel Rex PhD qualification examination. Federal University of Paraná. 2022
- Klauberg, C.; Marcatti, G., Silva, C. A. Final examination for Anne Laura da Silva – undergraduate course – forest engineering. Federal University of São João Del-Rei. 2021.
- Torres, C.; Amaral. C.; Almeida, D. R. A; Filho, E., Silva, C. A. Aguida Vianna Ph.D. qualification examination. Federal University of Viçosa. 2022.
- Rodriguez, L. e; Ferraz, S. F. B.; Avares, C.A; **Silva, C. A**. **Ph.D.** defense: Gabriel Atticciati Prata. Mapeamento da probabilidade de danos e cicatrizes de danos como suporte ou manejo de florestas. 2019. - University of São Paulo – "Luiz de Queiroz" college of Agriculture –ESALQ.
- Amaral, Cibele. **Silva, C. A;** et al.. **MSc defense**: Rodrigo Vieira Leite. Estimating stem volume of Eucalyptus using LiDAR: a comparison of individual tree and área-based approaches 2019. – Federal University of Viçosa - UFV.
- Brancalion, P. H. S.; Cesar, R. G.; **Silva, C. A.;** Gorgens, E. **Ph.D. defense**: Danilo Roberti Alves de Almeida. Assessing tropical forest degradation and restoration through lidar remote sensing. 2018. - University of São Paulo – "Luiz de Queiroz" college of Agriculture –ESALQ.
- Corte, A. P. D.; **Silva, C. A.;** Behling, A.; Sanquetta, C. **Ph.D. Exam**. Bruna Nascimento de Vasconcellos. Retrieving individual Araucaria angustifolia (BERT) tree attributes from field and terrestrial laser scanning (TLS) data. 2018. Federal University of Paraná - UFPR.
- Corte, A. P. D.; **Silva, C. A.;** Behling, A.; Sanquetta, C. **MSc. Exam.** Franciel Rex. Estimativas e dinâmica de biomassa acima do solo utilizando diferentes abordagens estatísticas e dados lidar em floresta tropical. 2018. Exame de qualificação (Doutorando em Engenharia Florestal) - Federal University of Paraná - UFPR.
- Carvalho, S. P. C.; Nicoletti, M. F.; **Silva, C. A Msc. Exam.** Influência do tamanho de parcelas na estimativa de parâmetros biométricos em uma floresta tropical Amazonica no Mato Grosso. 2018. Federal University of Mato Grosso.
- Mendonça, B. F.; Silva, C.A. et al. 2015. **Undergraduate final project defense.** Uelison Mateus Ribeiro. Algoritmos para geração de modelos digitais de terreno a partir de dados LIDAR aerotransportado. Federal Rural University of Rio de Janeiro (UFRJ).

COMPLEMENTARY TRAINING

Forest management and reduced impact logging (RIL). (course load: 85h). Tropical Forest Institute – IFT, Paragominas, Brazil. **2011**

RESEARCH PROPOSALS FUNDED (> $US 5 million)

- 2022-2025 - EMS4D: multi-scale fuel mapping and decision support system for next generation of fire management. Joint Fire Science Program. (Dr. Silva is PI). $492,115.
- 2021-2022- UF/IFAS: Forest-Level Examination of Silviculture Effects on Ecosystem Services (ForESEES) through integration of Remote Sensing with Field Experiments. (Dr. Silva is a Co-I). $57,690. PI- Jason Vogel - University of Florida
- 2021-2022- UF/IFAS: An integrated bioeconomic model for wildfire risk, surrounding forest management and tradeoffs of ecosystem services in the Deluca Preserve. (Dr. Silva is a Co-I). $78,247. PI- Andres Susaeta - University of Florida.
- 2020-2021 - USDA FS - Tree crown mapping from point cloud data for 3D fuel characterization. $50k. PI Dr. Silva - University of Florida.
- 2021-2026- NSF - Resolving the multi-scale drivers of tree mortality from field and remote sensing data on co-located ForestGEO-NEON. (Dr. Silva is a Co-I). ~$1.0M. PI- Daniel J. Johnson - University of Florida.
- 2020-2021 - USDA FS - Tree crown mapping from point cloud data for 3D fuel characterization. $50k. PI Dr. Silva - University of Florida.
- 2019-2024 - SERDP - Object-based aggregation of fuel structures, physics-based fire behavior and self-organizing smoke plumes for improved fuel, fire, and smoke management on military lands.US$ 2.6M – (Dr. Silva is a Co-I) - PI Dr. Andrew Hudak – US Forest Service – Rocky Mountain Research Station.
- 2019-2023- SERDP - 3D fuel characterization for evaluating physics-based fire behavior, fire effects, and smoke models on US Department of Defense military lands. (Dr. Silva is a Collaborator). US$ 2.4M. PI – Dr. Roger Ottmar - US Forest Service, Pacific Northwest Research Station
- 2019-2021 CNPq- Mapping fuel load and simulation of fire behavior and spread in the Cerrado biome using modeling and remote sensing technologies (Dr. Silva is a Co-I). US$ 45K. PI- Dr. Carine Klauberg - Federal University of Sao Joao Del-Rei, Brazil
- CNPq- Ph.D. Fellowship, Process: 249802/2013-9, US$ 130K – 2014-2018 (Funded)
- MSc. Fellowship - Foundation Support Research for State of São Paulo (FAPESP), Process: 2010/16525-7, US$ 7K - 2012 (Funded).

PROFISSIONAL SERVICES AND ACTIVITIES

- **Ad hoc Reviewer for academic journals (>30)**
  Remote Sensing of Environment, Forest Ecology and Management, Remote Sensing, Forests, Scientific Reports, Methods in Ecology and Evolution, Ecology and Evolution, Sensors, Land, ISPRS Journal of Photogrammetry and Remote Sensing, Computers and Electronics In Agriculture, Sustainability, International Journal of Digital Earth, Forest Ecology and Management, International Journal of Remote Sensing, Remote Sensing Letters, Science of The Total Environment, Environmental Research Letters, Floresta, ISPRS International Journal of Geo-Information, Remote Sensing Applications: Society and Environment, Environmental Research Communications, French Review of Photogrammetry and Remote Sensing, Forest Systems, New Zealand Journal of Forestry Science, Canadian Journal of Remote Sensing, Revista Floresta e Ambiente, Boletim de Ciências Geodésicas, Advances in Forestry Science, Cerne, African Journal of Environmental Science and Technology, Anais Da Academia Brasileira de Ciencias and others.

- **Reviewer for funding agencies**
  2022- NASA (e.g. ECOSTRESS program and NPP)

2022- Polish National Science Center (NCN)
2021- National Science Foundation (NSF)

- **Editorship**

1. Editorial Board: British Ecological Society - Methods in Ecology and Evolution (IF6.51): https://besjournals.onlinelibrary.wiley.com/journal/2041210X, 2019 – current.
2. Section Editor in Chief – Remote Sensing – MDPI - https://www.mdpi.com/journal/remotesensing/editors, 2021 – current.
3. Guest Editor: Special issue on " Applications of LiDAR and Photogrammetry for Forest Inventory and Management ", Forests (ISSN 1999-4907; IF: 2.116) (https://www.mdpi.com/journal/forests/special_issues/LiDAR_Inventory), 2018-2019.
4. Guest Editor: Special issue on "Carbon storage measurement through remote sensing", Remote Sensing (ISSN 2072-4292; IF: 4.118) (https://www.mdpi.com/journal/remotesensing/special_issues/carbon_storage_measurement), 2019-2020.
5. Guest Editor: Special issue on " LiDAR Remote Sensing of Forest Resources and Wildland Fires", Remote Sensing (ISSN 2072-4292; IF: 4.118) (https://www.mdpi.com/journal/remotesensing/special_issues/LiDAR_RS_Forest_Resources_Wildland_Fires); 2019-2021
6. Guest Editor: Special issue on " Remote Sensing Data Fusion for Mapping Ecosystem Dynamics", Remote Sensing (ISSN 2072-4292; IF: 4.118); (https://www.mdpi.com/journal/remotesensing/special_issues/DFMED)
7. 2019-2021 Guest Editor: Special issue on " Remote Sensing of Forest Disturbance and Recovery", Remote Sensing (ISSN 2072-4292; IF: 4.118);(https://www.mdpi.com/journal/forests/special_issues/RS_disturb); 2021-2022
8. Guest Editor: Special issue on " Drones for Ecology and Conservation", Remote Sensing (ISSN 2072-4292; IF: 4.118);(https://www.mdpi.com/journal/remotesensing/special_issues/Drones_Ecology_and_Conservation); 2021-2022

- **Mentoring**

2022-present: Monique Schlickmann (Ph.D, advisor)
2022-present: Diego Rocha (Ph.D, advisor)
2022-present: Jinyi Xia (Ph.D, advisor)
2022-2022: Luiz Guilherme Almeida Nogueira (Undergraduate, advisor)
2022-2022: Danilo Romeu Farias de Souza (Undergraduate, advisor)
2022-2022: Diogo Nepomuceno Cosenza (Postdoc, advisor)
2022-2022: Liam Halloran (Undergraduate, advisor)
2022-2022: Evan F. Quigley (Undergraduate, advisor)
2022-2022: Jennifer L. Jarman (Undergraduate, advisor)
2022-present: Dallas Young (Master of Science, advisor)
2019-present: Franciel Rex (Ph.D, co-advisor)
2019-2022: Rodrigo Vieira (Ph.D, co-advisor)
2019-2022: Maira Beatriz Teixeira da Costa (Ph.D, co-advisor)
2014-2020: Bruna Nascimento de Vasconcellos (Ph.D, co-advisor)
2017-2019: Vanessa Souza da Silva (MSc., co-advisor)
2017-2019: Franciel Rex (MSc., co-advisor)
2015-2017: Mid Mohan (MSc., external mentor)
2015-2018: Wan Shafrina Wan Mohd Jaafar (Ph.D., external mentor)
2015-2016: Marieli Sabrina Ruza (Undergraduate, co-advisor)

- **Advisory board**
  OpenTopography
  Precision Forestry Cooperative (PFC) – University of Washington (UW)

- **Memberships**
  American Geophysical Union (2015-2016)
  Ecological Society of America (2017-2018)
  Forest Biology Research Cooperative (FBRC) (2021-present)
  ProForest- UF/IFAS

- **Consulting (Forestry)**
  Klabin S/A – (2015-2018)

- **Research Groups**
  Founder of the Web-LiDAR Forest inventory application group in Facebook. >3.7k members
  https://www.facebook.com/groups/1504561379790934

AWARDS AND HONORS

- Thomas Hilker Early Career Scientist Award - ForestSAT **2022**
- College of Natural Resources (CNR) Outstanding Ph.D. Student, University of Idaho.
- Outstanding graduate, Ph.D. - Natural Resource and Society Department, University of Idaho
- 3rd oral presentation prize: Individual tree detection from LiDAR-derived canopy height models (CHM) in longleaf pine forest. 36th CSRS, St. John's N. Canada., 36th Canadian Symposium on Remote Sensing. **2015**
- 8th Brazilian Physics Olympiad (State of Santa Catarina, Brazil) **2005**

COMPUTER SKILLS

R, Python, FUSION/LDV, LAStools, MCC-LiDAR, ArcGIS, QGIS, ENVI, ALDPAT, Excel and others. **2012**

OPEN-SOURCE SOFTWARE DEVELOPED

- Klauberg, C.; Vogel, J.; Dalagnol, R.; Ferreira, M.; Broadbent, E.N.; Hamamura, C.; Souza, D.R.F.; Nogueira, L.G.A.; **Silva, C.A.** rTLsDeep: An R Package for Post-Hurricane Damage Severity Classification at the Individual Tree Level Using Terrestrial Laser Scanning and Deep Learning. Version 0.0.1. Available online: https://github.com/carlos-alberto-silva/rTLsDeep **2023**
- **Silva, C.A.;** Hudak, A.T; Vierling, L.A.; Valbuena, R.; Cardil, A.; Mohan, M.; Almeida, D. A.; Broadbent,E.N.; Zambrano,A. M. A.; Wilkinson, B., Sharma,A., Drake,J. B.; Medley,P. B., Vogel, J. G.; Prata,G. A.; Atkins, J.; Hamamura,C.; Klauberg, C. Treetop: A Shiny-based Application for Extracting Forest Information from LiDAR data. Version 0.0.1, accessed on March. 13 2021, available at: https://CRAN.R-project.org/package=treetop **(6008 downloads)** **2022**
- **2020**
- Almeida, D; Stark S. C.; **Silva, C.A.** et al. leafR: Calculates the Leaf Area Index (LAD) and Other Related Functions. Available at https://cran.r- **2019**

project.org/web/packages/leafR/index.html **(11K downloads)**

- **Silva, C.A.** et al. ForestGapR: Tropical Forest Gaps Analysis. Available at https://cran.r-project.org/web/packages/ForestGapR/index.html **(18k downloads)** **2019**
- **Silva, C.A.** et al. rForest: An R package for Forest Inventory Analysis. Available at https://r-forge.r-project.org/projects/rforest/ **(5266 downloads)** **2016**
- **Silva, C.A.** et al. rLiDAR: An R package for reading, processing and visualizing LiDAR (*Light Detection and Ranging*) data. Available at http://cran.r-project.org/web/packages/rLiDAR/index.html **(35k downloads)** **2015**
- **Silva, C.A.** et al. Web-LiDAR tools. Example: LiDAR TreeTop – Individual Tree Detection and forest structure assessment using Lidar Data on the web - Available at https://carlosasilva.shinyapps.io/LiDARTreeTop/ **2014**