Carlos Alberto Silva, Ph.D.

Assistant Professor of Quantitative Forest Science
School of Forest, Fisheries, and Geomatics Sciences – FFGS
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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 FFGS
University of Florida - UF

Courtesy Assistant Professor of Quantitative Forest Science **Jan. 2020 – April 2021**
School of Forest Resources and Conservation SFRC
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

USDA Forest Service - Rocky Mountain Research Station (RMRS) **Aug. 2013 – Jan. 2016**
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)

PEER REVIEWED PUBLICATIONS

2021

1. **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**. 2020. v253. https://doi.org/10.1016/j.rse.2020.112234
2. Faria, B. L. ; Marano, G.; Piponiot, C.; Silva, C. A. ; Dantas, V. De L. ; Rattis, L.; Rech, A. R.; Collalti, A. Model-Based Estimation of Amazonian Forests Recovery Time After Drought And Fire Events. **Forests**, V. 12, P. 8, 2021.
3. 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

In press

4. 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**. In press

In review

5. 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., Poulsen, J., Labrière, N., Barbier, N., Jeffery, K. K; et al. 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**. 2020.
6. Almeida, D. R. A.; Broadbent, E., Ferreira, M.N., Meli, P., Zambrano, A. M, ..., **Silva, C.,** Romanelli, J. et al. 2021. Monitoring restored tropical forest diversity and structure through UAV-borne hyperspectral and lidar fusion. **Remote Sensing of Environment**. In review.
7. Dorado-Roda, I., Pascual, A., Godinho, S., **Silva, C.A.,** Botequim et al. 2021. Assessing the transferability of ALS-derived biomass models to GEDI satellite observations in Mediterranean forests. **Remote Sensing**. In review.
8. Stitt, J.M., Hudak, A., **Silva, C.A**., Vierling, L. 2021. Characterizing individual tree-level snags using airborne lidar-derived forest canopy gaps within closed-canopy conifer forests. **Methods in Ecology and Evolution**. In review.

9. Cardil, A., Monedero,S., Schag,G., de-Miguel, S., Tapia, M., Stoof, C.R., **Silva, C. A**. et al. 2021. Fire behavior modeling for operational decision-making. **Current Opinion in Environmental Science & Health.** In review.

In preparation

10. Faria, B. L., Staal, A., Silva, C.A., Martin, P., Dantas,V. L. 2021. Climate change and deforestation increase the vulnerability of Amazonian forests to post-fire grass invasion. **Forest Ecology and Management**.
11. **Silva, C.A.,** Hudak, A., Valbuena, R., Cardil, A., Mohan, M., Almeida, D., Broadbent,E., Zambrano, A., Wilkinson, B., Sharma, A., Drake, J., Medley, P., Vogel, J., Klauberg,C. TreeTop: TreeTop: A Web-based Application Simplifying the Extraction of Forest Information from LiDAR data for Ecologists and Conservationist. **Methods in Ecology and Evolution**. 2020.
12. **Silva, C.A.,** et al. rGEDI: An R Package for NASA's Global Ecosystem Dynamics Investigation (GEDI) Data Visualizing and Processing. **Remote Sensing of Environment**. 2020.
13. Klauberg, C.; Vidal, E.; **Silva, C.A**., Mohan, M., Cardil, A. et al. Impact of Management Practices on the Sustainability of Roots Production and Yield of Heteropsis spp. in Amazonian Forest. **Forests**. 2020
14. Leite, R.V., **Silva, C. A**., Broadbent, E. Large scale multi-layer fuel load characterization in tropical savanna using GEDI spaceborne lidar data. **Remote Sensing of Environment**.
15. **Silva, C.A**., Hudak, A., Klauberg, C., Rowell, E, Mohan, M., Cardil, A. Comparison of terrestrial and airborne lidar-derived crown attributes estimates in longleaf pine forest at Eglin Air Force Base, Florida, USA. **Remote Sensing**. 2020
16. Pinagé, E. R., Bell, D. M., Longo, M., Gao, S., **Silva, C. A**. 2021. Forest structure and photosynthesis across intact and degraded forests in the Amazon. **Remote Sensing of Environment**.
17. Merrick, T., Bennartz, R., Jorge,M., …**Silva, C.A**. et al. Satellite solar-induced chlorophyll fluorescence and vegetation indices to track temperate deciduous forest seasonality. **Remote Sensing of Environment**
18. Rex, F. E., **Silva, C. A**., Broadbent, E., A Multi-Sensor approach for assessing the Species Diversity in the Brazilian savanna. Remote Sensing.

2020

19. 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
20. Valbuen, R., O'Connor, B., Zellweger, F., Simonson, W., Coops, N.C., Morsdorf, F., Vihervaara P., Maltamo, M., Danks, F., Chirici, G., **Silva, C. A.,** Almeida, D., Coomes DA. Standardizing Ecosystem Morphological Traits from 3D Information Sources. **Trends in Ecology & Evolution**. 2020. *https://doi.org/10.1016/j.tree.2020.03.006*
21. Duncanson, L., Neuenschwander, A., Hancock, S., Thomas, N., Fatoyinbo, T., Simard, M., Luthcke, S., **Silva, C. A.,** Armston, J., Hofton, M., Dubayah, R. Biomass estimation from simulated GEDI, ICESat-2 and NISAR across environmental gradients in Sonoma County, California. **Remote Sensing of Environment**. 2020. https://doi.org/10.1016/j.rse.2020.111779
22. Almeida, D. A.; Almeyda Z. A.; Broadbent, E. N.; Wendt, A. L.; Foster, P. ; Wilkinson, B. E. ; Salk, C.; Papa, D.; Stark, S.; Valbuena, R.; Gorgens, E.; Silva, C.; Brancalion, P.; Fagan, M.; Meli, P.; Chazdon, R. Detecting successional changes in tropical forest structure using GatorEye drone-borne lidar. **Biotropica,** v. 1, p. 1, 2020. https://doi.org/10.1111/btp.12814

23. Qu, Y., Shaker, A., Korhonen, L. **Silva, C.A**., Jia, K., Tian, L., Song, J. Retrieval of leaf area index from airborne discrete return LiDAR data and Beer-Lambert law in a mixed conifer forest. **Remote Sensing**. 2020
24. Saluma, R.B, Filho, P W., Simard, M., **Silva, C.A** et al. Improving Mangrove Aboveground Biomass Estimates Using lidar. **Estuarine, Coastal and Shelf Science.** 2020.
25. Dalla Corte, A.P.; Rex, F.E.; Almeida, D.R.A.; Sanquetta, C.R.; **Silva, C.A.;** Moura, M.M.; Wilkinson, B.; Zambrano, A.M.A.; Cunha Neto, E.M.; Veras, H.F.P.; Moraes, A.; Klauberg, C.; Mohan, M.; Cardil, A.; Broadbent, E.N. Measuring Individual Tree Diameter and Height Using GatorEye High-Density UAV-Lidar in an Integrated Crop-Livestock-Forest System. **Remote Sens**. 2020, 12, 863.
26. Silva, V.S.; **Silva, C.A**.; Mohan, M.; Cardil, A.; Rex, F.E.; Loureiro, G.H.; Almeida, D.R.A.; Broadbent, E.N.; Gorgens, E.B.; Dalla Corte, A.P.; Silva, E.A.; Valbuena, R.; Klauberg, C. Combined Impact of Sample Size and Modeling Approaches for Predicting Stem Volume in Eucalyptus spp. Forest Plantations Using Field and LiDAR Data. **Remote Sens**. 2020, 12, 1438.
27. Nicoletti, Marcos Felipe ; Carvalho, Samuel De Pádua Chaves E ; Machado, Sebastião Do Amaral; Costa, Valdeci José ; Silva, Carlos Alberto ; Topanotti, Larissa Regina . Bivariate and generalized models for taper stem representation and assortments production of loblolly pine (*Pinus taeda* L.). **Journal of Environmental Management**, v. 270, p. 110865, 2020.
28. D'Oliveira, M V. N. ; Broadbent, E. N. ; Oliveira, Luis C. ; **Silva, C.,** et al.. Aboveground Biomass Estimation in Amazonian Tropical Forests: a Comparison of Aircraft- and GatorEye UAV-borne LiDAR Data in the Chico Mendes Extractive Reserve in Acre, Brazil. **Remote Sensing**, v. 12, p. 1754, 2020.
29. Marshak, C. ; Simard, M,; Duncanson, L.; Silva, C. et al. Regional Tropical Aboveground Biomass Mapping with L-Band Repeat-Pass Interferometric Radar, Sparse Lidar, and Multiscale Superpixels. **Remote Sensing**, v. 12, p. 2048, 2020.
30. Rex, F., **Silva, C.A.,** Corte, A.P., Klauberg, C., Mohan, M., Cardil, A., Hudak, A. Comparison of Statistical Modelling Approaches for Estimating Tropical Forest Aboveground Biomass Stock and Reporting Their Changes in Low-Intensity Logging Areas Using Multi-Temporal LiDAR Data. **Remote Sensing**. 2020
31. Leite, R.V.; Silva, C.A.; Mohan, M.; Cardil, A.; Almeida, D.R.A.; Carvalho, S.P.C.; Jaafar, W.S.W.M.; Guerra-Hernández, J.; Weiskittel, A.; Hudak, A.T.; Broadbent, E.N.; Prata, G.; Valbuena, R.; Leite, H.G.; Taquetti, M.F.; Soares, A.A.V.; Scolforo, H.F.; Amaral, C.H.; Dalla Corte, A.P.; Klauberg, C. Individual Tree Attribute Estimation and Uniformity Assessment in Fast-Growing Eucalyptus spp. Forest Plantations Using Lidar and Linear Mixed-Effects Models. Remote Sens. 2020, 12, 3599.
32. Silva Junior, C. H. L.; Heinrich, V. H. A. ; Freire, A. T. G.; Broggio, I. S. ; Rosan, T. M.; Doblas, J.; Anderson, L. O. ; Rousseau, G. X.; Shimabukuro, Y. E. ; **Silva, C. A**. ; House, J. I. ; Aragão, L. E. O. C. Benchmark maps of 33 years of secondary forest age for Brazil. **Scientific Data**, v. 7, p. 1, 2020. https://doi.org/10.6084/m9.figshare.12622025
33. Brancalion, P. H.S. ; Broadbent, E. N.; De-Miguel, S.; Cardil, A.; Rosa, M. R.; Almeida, C. T. ; Almeida, D. R.A. ; Chakravarty, S.; Zhou, M.; Gamarra, J. G.P. ; Liang, J.; Crouzeilles, R.; Hérault, B.; Aragão, L. E.O.C. **; Silva, C**. A.; Almeyda-Zambrano, A. M. Emerging threats linking tropical deforestation and the COVID-19 pandemic. **Perspectives in Ecology and Conservation**, v. 1, p. 1, 2020.
34. Rex, F. E. ; Corte, A. P. D. ; **Silva, C. A.** ; Machado, S. A. ; Sanquetta, C. R. . Dynamics of Above-Ground Biomass in the Brazilian Amazon Using LiDAR Data. Anuário Do Instituto De Geociências (Ufrj. Impresso), V. 43, P. 228-238, 2020.
35. Corte, A. P. D.; Souza, D. V.; Rex, F. Ed.; Sanquetta, C. R. ; Mohan, M.; **Silva, C. A.;** Zambrano, A. M. A.; Prata, G.; Almeida, D. R.; Trautenmüller, J. W.; Klauberg, C.; De Moraes, A.; Sanquetta, M. N. ; Wilkinson, B.; Broadbent, E. N.. Forest inventory with high-density UAV-Lidar: Machine

learning approaches for predicting individual tree attributes. **Computers and Electronics In Agriculture**, v. 179, p. 105815, 2020.

36. Cardil, A.; Rodrigues, M.; Ramirez, J.; De-Miguel, S.; **Silva, C. A**.; Mariani, M.; Ascoli, D.. Coupled effects of climate teleconnections on drought, Santa Ana winds and wildfires in southern California. **Science Of The Total Environment**, v. 1, p. 142788, 2020.
37. 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** in press https://doi.org/10.1088/1748-9326/abcac7
38. Wan Mohd Jaafar, Wan S.; Said, Nor F.S.; Abdul Maulud, Khairul N.; Uning, Royston; Latif, Mohd T.; Muhmad Kamarulzaman, Aisyah M.; Mohan, Midhun; Pradhan, Biswajeet; Saad, Siti N.M.; Broadbent, Eben N.; Cardil, Adrián; Silva, Carlos A.; Takriff, Mohd S. 2020. "Carbon Emissions from Oil Palm Induced Forest and Peatland Conversion in Sabah and Sarawak, Malaysia" Forests 11, no. 12: 1285. https://doi.org/10.3390/f11121285
39. Prata, Gabriel A.; Broadbent, Eben N.; de Almeida, Danilo R.A.; St. Peter, Joseph; Drake, Jason; Medley, Paul; Corte, Ana P.D.; Vogel, Jason; Sharma, Ajay; Silva, Carlos A.; Zambrano, Angelica M.A.; Valbuena, Ruben; Wilkinson, Ben. 2020. "Single-Pass UAV-Borne GatorEye LiDAR Sampling as a Rapid Assessment Method for Surveying Forest Structure" Remote Sens. 12, no. 24: 4111. https://doi.org/10.3390/rs12244111

2019

40. Gasparini, K. A., Silva Junior, C, Shimabukuro, Y., **Silva, C. A**., et al. Determining a Threshold to Delimit the Amazonian 3 Forests from Tree Canopy Cover 2000 Data. **Sensors**. 2019
41. **Silva, C.A**., Pinagé,E., Mohan, M., Valbuena, R., Almeida, D., Broadbent,E., Jaafar, W., Papa, D., Cardil, A., Klauberg, C. ForestGapR: An R Package for Airborne Laser Scanning-derived Tropical Forest Gaps Analysis. **Methods in Ecology and Evolution**. 2019.
42. Klauberg, C., Hudak, A., **Silva, C.A**., Lewis, S., Robichaud, P., Jain, T. Characterizing fire effects on conifers at tree level from airborne laser scanning and high-resolution, multispectral satellite data. **Ecological Modeling**. 2019.
43. Eitel, J. ; Maguire, A. ; Boelman, N. ; Vierling, L. A. ; Griffin, K. ; Jensen, J. ; Magney, T. ; Mahoney, P. ; Meddens, A. ; **Silva, C. A.** ; Sonnentag, O. . Proximal remote sensing of tree physiology at northern treeline: Do late-season changes in the photochemical reflectance index (PRI) respond to climate or photoperiod?. **Remote Sensing of Environment**, v. 221, p. 340-350, 2019.
44. Ramirez, J., Monedero, S., **Silva C.A**., Cardil, A. Stochastic decision trigger modelling to assess the probability of wildland fire impact. **Science of the Total Environment**. 2019.
45. Cardil, A., Vega-García, C., Ascoli D., Molina-Terrén DM., **Silva C.A**., Rodrigues, M. How does drought impact burned area in Mediterranean vegetation communities? **Science of the Total Environment.** 2019.
46. Mohan, M., Mendonça, B., **Silva, C.A**., Klauberg, C., Ribeiro, R., Araújo, E., Monte, M., Cardil, Optimizing Individual Tree Detection Accuracy and Measuring Forest Uniformity in Coconut (Cocos nucifera L.) Plantations using Airborne Laser Scanning. **Ecological Modeling**. 2019.
47. Almeida, D., Stark, S. C., Schietti, J. Camargo, J. L. C., Amazonas, N. T., Gorgens, E. B., Rosa, D. M.Smith, M. N., Valbuena, R, Saleska, S., Andrade, A., Mesquita, R., Laurance, S. G., Laurance, W. F. h, Lovejoy, T. E d, Broadbent, E., Shimabukuro, Y. E., Parker, G. G., Lefsky, M., **Silva, C. A**., Brancalion, P. H. Persistent effects of fragmentation on tropical rainforest canopy structure after years of isolation. **Ecological Applications**. 2019.
48. Valbuena, R. Hernando, A., Manzaner, J., Görgen, E., Almeida, D., **Silva, C.A**., García-Abri, A. Evaluating observed versus predicted forest biomass: R-squared, index of agreement or maximal information coefficient?". **European Journal of Remote Sensing**. 2019.

49. 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. **International Journal of Applied Earth Observations and Geoinformation**. 2019.
50. Burattoa, D.A ; Juniora, R ; Timofeiczyk, R. ; Silva, J.C.G.L. ; Fregaa, J.R. ; Wiechetecke, M.S.S.A.; **Silva, C. A**. Use of Artificial Neural Networks and Arima to Forecasting Consumption Sawnwood of Pinus sp. in Brazil. **International Forestry Review**, v. 21, p. 51-61, 2019

51. Cardil, A.; Otsu, K. ; Pla, M. **; Silva, C. A.** ; Brotons, L. Quantifying pine processionary moth defoliation in a pine-oak mixed forest using unmanned aerial systems and multispectral imagery. **PlosOne**, 2019
52. Cardil, A.; Ramirez, J. ; Monedero, S. ; **Silva, C. A**. Assessing and reinitializing wildland fire simulations through satellite active fire data. **Journal of Environmental Management**, v. 231, p. 996-1003, 2019.
53. Molina-Terren, D. M. ; Xanthopoulos, G. ; Diakakis, M. ; Ribeiro, L. ; Caballero, D. ; Delogu, G. M. ; Viegas, D. X. ; **Silva, C. A**. ; Cardil, A. . Analysis of forest fire fatalities in Southern Europe: Spain, Portugal, Greece and Sardinia (Italy). **International Journal of Wildland Fire**, v. 1, p. 1, 2019.
54. Almeida, D. R. A. ; Stark, S. C. ; Shao, G. ; Schietti, J. ; Nelson, B. W. ; **Silva, C.A** ; Gorgens, E. ; Valbuena, R. ; Papa, D. A. ; Brancalion, P. H. S. . Optimizing the Remote Detection of Tropical Rainforest Structure with Airborne Lidar: Leaf Area Profile Sensitivity to Pulse Density and Spatial Sampling. **Remote Sensing**, v. 11, p. 1, 2019.
55. Cardil, A.; Monedero, S. ; **Silva, C. A**. ; Ramirez, J. Adjusting the rate of spread of fire simulations in real-time. **Ecological Modelling**, v. 395, p. 39-44, 2019.
56. Almeida, D. R. A. ; Stark, S. C. ; Chazdon, R. ; Nelson, B. W. ; Cesar, R. ; Meli, P. ; Gorgens, E. ; Duarte, M. M. ; Valbuena, R. ; Moreno, V. ; Mendes, A. F. ; Amazonas, N. T. ; Goncalves, N. ; **Silva, C. A**. ; Schietti, J. ; Brancalion, P. H. S. The effectiveness of lidar remote sensing for monitoring forest cover attributes and landscape restoration. **Forest Ecology and Management**, v. 438, p. 34-43, 2019.
57. Rex, F. ; Corte, Ana Paula Dalla ; Sanquetta, C. R. ; Machado, S. A. ; **Silva, C. A.** . Estimativa de Biomassa Aérea de Araucaria angustifolia (Bertol.) Kuntze POR DADOS LiDAR. **Floram**, 2019.
58. Guerra-Hernández, J., Cozensa, D., Cardil, A., **Silva, C.A.,** Botequim, B., Soares, P., Silva, M. González-Ferreiro, E. Díaz-Varela, R. A. Predicting Growing Stock Volume of Eucalyptus plantations using 3-D point clouds derived from UAV imagery and ALS data. **Forests**. 2019.
59. Papa, D., Almeida, D., Estraviz, L.C., Valbuena. R., **Silva, C.A**. et al. Characterizing and Stratifying Tropical Forests to Reduce Field Sample Effort From Lidar Data. **Forest Ecology and Management**. 2019.
60. Almeida. D., Stark, S., Valbuena, R., Broadbent, E., Silva, T., Resende, A., Ferreira, M., Cardil, A., **Silva, C.A.,** Amazonas, N., Zambranoi, A., Brancalion. P. A new era in forest restoration monitoring. **Restoration Ecology**. 2019

2018

61. **Silva, C. A.**; Saatchi, S. ; Alonso, M. G. ; Labriere, N. ; Klauberg, C. ; Ferraz, A. ; Meyer, V. ; Jeffery, K. J. ; Abernethy, K. ; White, L. ; Zhao, K. ; Lewis, S. L. ; Hudak, A. T. . 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**, p. 1-15, 2018.

62. Klauberg, C. ; Hudak, A. ; Bright, B. C. ; Boschetti, L. ; Dickinson, M. ; Kremens, R. ; **Silva, C. A.** . Use of ordinary kriging and Gaussian conditional simulation to interpolate airborne fire radiative energy density estimates. **International Journal of Wildland Fire**, v. 27, p. 228, 2018.
63. Hentz, A. M. K. ; **Silva, C. A.** ; Corte, A. P. D. ; Netto, S. P. ; Strager, M. P. ; Klauberg, C. . Estimating forest uniformity in Eucalyptus spp. and Pinus taeda L. stands using field measurements and structure from motion point clouds generated from unmanned aerial vehicle (UAV) data collection. **Forest Systems**, v. 27, p. e005, 2018.
64. Qu, Y. ; Shaker, A. ; **Silva, C. A.** ; Klauberg, C. ; Pinage, E. R. . Remote Sensing of Leaf Area Index from LiDAR Height Percentile Metrics and Comparison with MODIS Product in a Selectively Logged Tropical Forest Area in Eastern Amazonia. **Remote Sensing**, v. 10, p. 970, 2018.
65. Ferraz, A. ; Saatchi, S. ; Xu, L. ; Hagen, S. ; Chave, J. ; Yu, Y. ; Meyer, V. ; Alonso, M. G. ; **Silva, C.A** ; Roswintiart, O. ; Samboko, A. ; Sist, P. ; Walker, S. ; Pearson, T. ; Wijaya, A. ; Sullivan, F. ; Rutishauser, E. ; Hoekman, D. ; Ganguly, S. . Carbon storage potential in degraded forests of Kalimantan, Indonesia. **Environmental Research Letters**, v. 1, p. 1, 2018.
66. **Silva, C.A;** Klauberg, C. ; Hudak, Andrew T. ; Vierling, L. A. ; Liesenberg, V. ; Bernett, L. G. ; Scheraiber, C. ; Schoeninger, E. . Estimating Stand Height and Tree Density in Pinus taeda plantations using in-situ data, airborne LiDAR and k-Nearest Neighbor Imputation. **Anais Da Academia Brasileira de Ciências**, v. 90, p. 295-309, 2018.
67. Huo, L. ; **Silva, C. A.** ; Klauberg, C. ; Mohan, M. ; Zhao, L. ; Tang, P. ; Hudak, A. T. . Supervised spatial classification of multispectral LiDAR data in urban areas. **PLOS One**, v. 13, p. e0206185, 2018.
68. Jaafar, W. S. W. M. ; Woodhouse, I. H. ; **Silva, C. A.** ; Omar, H. ; Maulud, K. N. A. ; Hudak, Andrew T. ; Klauberg, C. ; Cardil, A. ; Mohan, M. . Improving Individual Tree Crown Delineation and Attributes Estimation of Tropical Forests Using Airborne LiDAR Data. **Forests**, v. 9, p. 759, 2018.
69. **Silva, C. A.;** Klauberg, C. ; Hentz, A. M. K. ; Corte, A. P. D. ; Ribeiro, U. ; Liesenberg, V. . Comparing the Performance of Ground Filtering Algorithms for Terrain Modeling in a Forest Environment Using Airborne LiDAR Data. **Floram**, v. 25, p. 2-10, 2018.

2017

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51. **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.
52. 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.
53. 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.
54. **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.
55. **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.

CONFERENCE TALKS AND PRESENTATIONS

1.	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**
2.	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**
3.	Introdução a tecnologia LiDAR aplicada a Engenharia Florestal- Federal University of São João del-Rei	**2019**
4.	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**
5.	Mensuração e inventário florestal em áreas urbanas com geotecnologias - Federal University of São João del-Rei	**2019**
6.	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**
7.	Combinando métricas de copa derivadas do LiDAR aerotransportado e terrestre para descrição da estrutura florestal - Federal University of São João del-Rei	**2019**
8.	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**
9.	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**

10. ForestSAT 2016 (Santiago, Chile) Silva, C. A. et al. "Modeling aboveground Biomass from individual tree LiDAR-derived metrics in tropical forest". **2016**
11. 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**
12. LiDAR Remote Sensing for Forestry applications - Federal University of Mato Grosso **2016**
13. Geospatial Technologies in Precision Agriculture - Federal University of Mato Grosso **2016**
14. 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

- 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**
- 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

- 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**

PROPOSALS

- 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. (Collaborator). US$ 2.4M – 2019 (4 years) (**Proposal accepted**) – PI Dr. Andrew Hudak – US Forest Service – Rocky Mountain Research Station.
- SERDP - 3D fuel characterization for evaluating physics-based fire behavior, fire effects, and smoke models on US Department of Defense military lands. (Collaborator). US$ 2.6M -2019-2023 (**Funded**). PI – Dr. Roger Ottmar - US Forest Service, Pacific Northwest Research Station
- CNPq- Mapping fuel load and simulation of fire behavior and spread in the Cerrado biome using modeling and remote sensing technologies (Co-PI). US$ 45K – 2018 (Funded)
- 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

- **Reviewer (>30 journals)**
  Forest Ecology and Management, Forests, Scientific Reports, 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, Forests, Advances in Forestry Science, Cerne, Remote Sensing, African Journal of Environmental Science and Technology, Interdisciplinary Sciences-Computational Life Sciences, Anais Da Academia Brasileira de Ciencias, 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

- **Editorship**

1. Editorial Board: British Ecological Society - Methods in Ecology and Evolution (IF6.51): https://besjournals.onlinelibrary.wiley.com/journal/2041210X
2. 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.

3. 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.
4. 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

- **Mentoring**
  2019-present: Rodrigo Vieira (Ph.D, co-advisor)
  2019-present: Maira Beatriz Teixeira da Costa (Ph.D, co-advisor)
  2019-present: Franciel Rex (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)

- **Memberships**
  American Geophysical Union (2015-2016)
  Ecological Society of America (2017-2018)

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

AWARDS AND HONORS

- College of Natural Resources (CNR) Outstanding Ph.D. Student, University of Idaho. **2018**
- 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) **2005**

COMPUTER SKILLS

R, Python (Arcpy), FUSION/LDV, LAStools, MCC-LiDAR, ArcGIS, QGIS, ENVI, ALDPAT, Excel. **2012**

SOFTWARE DEVELOPED

- Silva et al. rGEDI: An R Package for NASA's Global Ecosystem Dynamics Investigation (GEDI) Data Visualizing and Processing. https://github.com/carlos-alberto-silva/rGEDI **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-project.org/web/packages/leafR/index.html **2019**
- **Silva, C.A.** et al. ForestGapR: Tropical Forest Gaps Analysis. Available at https://cran.r-project.org/web/packages/ForestGapR/index.html **2019**
- **Silva, C.A.** et al. rForest: An R package for Forest Inventory Analysis. Available at **2016**

https://r-forge.r-project.org/projects/rforest/

- **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 **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**