

MICHELE DALPONTE

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My research activity is in remote sensing applied to forestry and ecology. I work with hyperspectral, multispectral, lidar and SAR remote sensing data to study the forest biodiversity and composition, the forest biomass and structure and forest health and disturbances.

Professional Experience

- 01/2016 – Now Researcher
Fondazione Edmund Mach, via E. Mach 1, 38098 San Michele all'Adige, Italy.
Research on remote sensing for forestry and ecology applications.
- 09/2014 – 12/2015 Post-Doc
Fondazione Edmund Mach, via E. Mach 1, 38098 San Michele all'Adige, Italy.
Research on airborne laser scanning (ALS) and hyperspectral remote sensing data for forestry applications inside the STEM, IperspettralePAT, and Trees4Future projects.
- 03/2015 – 06/2015 Post-Doc
09/2015 – 12/2015 *Department of Plant Sciences, University of Cambridge, Downing Street, Cambridge, UK.*
Analysis of tropical forest areas in Borneo with hyperspectral and ALS data.
- 05/2011 – 08/2014 Post-Doc
Fondazione Edmund Mach, via E. Mach 1, 38098 San Michele all'Adige, Italy.
Analysis of forest areas with hyperspectral and ALS data: comparisons among alpine and boreal forests. The work was carried out in the framework of the project SpectraLIDAR founded by the European Community's Seventh Framework Programme FP7/2007-2013 under grant agreement Marie Curie 7th Framework Program - PCOFUND-GA-2008-226070, acronymy “progetto Trentino”. The work is carried out partially at the Edmund Mach Foundation (Italy), and partially at the Norwegian University of Life Sciences (Norway).
- 09/2011 – 04/2013 Visiting Researcher
Norwegian University of Life Sciences, Postboks 5003, 1432 Ås, Norway.
Analysis of forest areas with hyperspectral and ALS data: comparisons among alpine and boreal forests. The work is carried out in the framework of the project SpectraLIDAR founded by the European Community's Seventh Framework Programme FP7/2007-2013 under grant agreement Marie Curie 7th Framework Program - PCOFUND-GA-2008-226070, acronymy “progetto Trentino”. The work is carried out partially at the Edmund Mach Foundation (Italy), and partially at the Norwegian University of Life Sciences (Norway).
- 06/2010 – 04/2011 Post-Doc
Fondazione Edmund Mach, via E. Mach 1, 38098 San Michele all'Adige, Italy.
Analysis of forest areas with multispectral, hyperspectral and ALS data.
- 11/2009 – 12/2009 Independent Consultant
Fondazione Edmund Mach, via E. Mach 1, 38098 San Michele all'Adige, Italy.
Estimation of forest attributes with airborne laser scanning (ALS) data in the framework of the project CARBOITALY (funded by the Italian Ministry of University and Research).

Education and training

- 11/2006 – 03/2010 PhD in Information and Communication Technologies
University of Trento, via Sommarive 14, 38123 Povo (TN), Italy.
Research in Remote Sensing and Pattern Recognition, in particular analysis of forest areas by advanced remote sensing systems based on hyperspectral and airborne laser scanning (ALS) data. Advisor: Prof. Lorenzo Bruzzone. During the PhD I carried out a three months internship at the University of British Columbia (Canada).
- 11/2013 – 07/2006 Master's Degree in Telecommunication Engineering
University of Trento, via Mesiano 77, 38123 Povo (TN), Italy.
Main topics: remote sensing, pattern recognition, C and C++ programming, image processing. Thesis on a novel and automatic system for the classification of electroencephalographic (EEG) data.
- 09/2000 – 10/2003 Bachelor's Degree in Telecommunication Engineering
University of Trento, via Mesiano 77, 38123 Povo (TN), Italy.
Main topics: mathematics, C and C++ programming, remote sensing systems, pattern recognition. Thesis on the analysis and classification of low resolution remote sensing images (SPOT-VGT). The bachelor's thesis was carried out at Sarmap s.a. (Switzerland).

Internships

- 10/2015 – 11/2015 *Department of Global Ecology, Carnegie Institution for Science, Stanford University, 260 Panama St., Stanford, CA 94305, USA*
Analysis of hyperspectral data for species classification in tropical areas.
- 09/2008 – 12/2008 *Integrated Remote Sensing Studio, Department of Forest Resources Management, University of British Columbia, 2424 Main Mall, V6T1Z4 Vancouver, Canada*
Analysis of the effectiveness of multi-return airborne laser scanning (ALS) data in the estimation of tree stem volume.
- 06/2003 – 09/2003 *sarmap s.a., Cascine di Barico, 6989 Purasca, Switzerland*
Analysis and classification of low resolution remote sensing images (SPOT-VGT). Development of a software module integrated in the software "SARscape" for the analysis of SPOT-VGT images.

Associate Editorship

2016 - Now IEEE Geoscience and Remote Sensing Letters.

Organizing committees of international conferences

2014 ForestSAT2014 (<http://forestsat2014.com/>).

Papers published in international journals

P. Naik, **M. Dalponte**, L. Bruzzone, "Automated Machine Learning Driven Stacked Ensemble Modelling for Forest Aboveground Biomass Prediction Using Multitemporal Sentinel-2 Data," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 2023

- L. Beese, **M. Dalponte**, G. P. Asner, D. A. Coomes and T. Jucker, "Using repeat airborne LiDAR to map the growth of individual oil palms in Malaysian Borneo during the 2015–16 El Niño," *International Journal of Applied Earth Observation and Geoinformation*, Vol. 115, 2022.
- D. Rocchini, M. J. Santos, S. L. Ustin, J.-B. Feret, G. P. Asner, C. Beierkuhnlein, **M. Dalponte**, H. Feilhauer, G. M. Foody, G. N. Geller, T. W. Gillespie, K. S. He, D. Kleijn, P. J. Leita, M. Malavasi, V. Moudry, J. Mullerova, H. Nagendra, S. Normand, C. Ricotta, M. E. Schaepman, S. Schmidtlein, A. K. Skidmore, P. Simova, M. Torresani, P. A. Townsend, W. Turner, P. Vihervaara, M. Wegmann, and J. Lenoir, "The spectral species concept in living color," *Journal of Geophysical Research - Biogeosciences*, Vol. 127, No. 9, 2022.
- B. Allen, **M. Dalponte**, H. O. Ørka, Erik Næsset, S. Puliti, R. Astrup and T. Gobakken, "UAV-Based Hyperspectral Imagery for Detection of Root, Butt, and Stem Rot in Norway Spruce" *Remote Sensing*, Vol. 14, No. 15, 2022.
- M. Dalponte**, Y. T. Solano-Correa, L. Frizzera, D. Gianelle, "Mapping a European spruce bark beetle outbreak using Sentinel-2 remote sensing data," *Remote Sensing*, Vol. 14, No. 13, 2022.
- D. Andreatta, D. Gainelle, M. Scotton, **M. Dalponte**, "Estimating grassland vegetation cover with remote sensing: a comparison between Landsat-8, Sentinel-2 and PlanetScope imagery," *Ecological Indicators*, Vol. 141, 2022.
- T. Jucker, F. J. Fischer, J. Chave, D. A. Coomes, J. Caspersen, A. Ali, G. J. Loubota Panzou, T. R. Feldpausch, D. Falster, V. A. Usoltsev, S. Adu-Bredu, L. F. Alves, M. Aminpour, I. B. Angoboy, N. P. R. Anten, C. Antin, Y. Askari, R. Muñoz Avilés, N. Ayyappan, P. Balvanera, L. Banin, N. Barbier, J. J. Battles, H. Beeckman, Y. E. Bocko, B. Bond-Lamberty, F. Bongers, S. Bowers, T. Brade, M. van Breugel, A. Chantrain, R. Chaudhary, J. Dai, **M. Dalponte**, K. Dimobe, J.-C. Domec, J.-L. Doucet, R. A. Duursma, M. Enríquez, K. Y. van Ewijk, W. Farfán-Rios, A. Fayolle, E. Forni, D. I. Forrester, H. Gilani, J. L. Godlee, S. Gourlet-Fleury, M. Haeni, J. S. Hall, J.-K. He, A. Hemp, J. L. Hernández-Stefanoni, S. I. Higgins, R. J. Holdaway, K. Hussain, L. B. Hutley, T. Ichie, Y. Iida, H. Jiang, P. Raj Joshi, H. Kaboli, M. Kazempour Larsary, T. Kenzo, B. D. Kloeppel, T. Kohyama, S. Kunwar, S. Kuyah, J. Kvasnica, S. Lin, E. R. Lines, H. Liu, C. Lorimer, J.-J. Loumeto, Y. Malhi, P. L. Marshall, E. Mattsson, R. Matula, J. A. Meave, S. Mensah, X. Mi, S. Momo, G. R. Moncrieff, F. Mora, S. P. Nissanka, K. L. O'Hara, S. Pearce, R. Pelissier, P. L. Peri, P. Ploton, L. Poorter, M. Javanmiri Pour, H. Pourbabaie, J. M. Dupuy Rada, S. C. Ribeiro, C. Ryan, A. Sanaei, J. Sanger, M. Schlund, G. Sellan, A. Shenkin, B. Sonké, F. J. Sterck, M. Svátek, K. Takagi, A. T. Trugman, F. Ullah, M. A. Vadeboncoeur, A. Valipour, M. C. Vanderwel, A. G. Vovides, W. Wang, L.-Q. Wang, C. Wirth, M. Woods, W. Xiang, F. de A. Ximenes, Y. Xu, T. Yamada and M. A. Zavala, "Tallo – a global tree allometry and crown architecture database," *Global Change Biology*, 2022.
- P. Naik, **M. Dalponte**, L. Bruzzone, "Generative Feature Extraction from Sentinel 1 and 2 data for Prediction of Forest Aboveground Biomass in the Italian Alps," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, Vol. 15, 2022.
- M. Dalponte**, Y. T. Solano-Correa, H. O. Ørka, E. Næsset, T. Gobakken, "Detection of heartwood rot in Norway spruce trees with lidar and multi-temporal satellite data," *International Journal of Applied Earth Observation and Geoinformation*, Vol. 109, May 2022.
- M. Dalponte**, A. J.I. Kallio, H. O. Ørka, E. Næsset, T. Gobakken, "Wood decay detection in Norway spruce forests based on airborne hyperspectral and ALS data," *Remote Sensing*, Vol. 14, No. 8, 2022.
- B. Allen, **M. Dalponte**, A. M. Hietala, H. O. Ørka, E. Næsset, T. Gobakken, "Detection of Root, Butt, and Stem Rot presence in Norway Spruce with hyperspectral imagery" *Silva Fennica*, Vol. 56, No. 2, 2022.
- D. Andreatta, D. Gianelle, M. Scotton, L. Vescovo, **M. Dalponte**, "Detection of grassland mowing frequency using time series of vegetation indices from Sentinel-2 imagery," *GIScience & Remote Sensing*, Vol. 59, No.1, pp. 481-500, 2022.
- L. Duncanson, J. R. Kellner, J. Armston, R. Dubayah, D. M. Minor, S. Hancock, S. P. Healey, P. L. Patterson, S. Saarela, S. Marselis, C. E. Silva, J. Bruening, S. J. Goetz, H. Tang, M. Hofton, B. Blair, S. Luthcke, L. Fatoyinbo, K. Abernethy, A. Alonso, H.-E. Andersen, P. Aplin, T. R. Baker, N. Barbier, J. F. Bastin, P. Biber, P. Boeckx, J. Bogaert, L. Boschetti, P. Brehm Boucher, D. S. Boyd, D. F.R.P. Burslem, S. Calvo-Rodriguez, J. Chave, R. L. Chazdon, D. B. Clark, D. A. Clark, W. B. Cohen, D. A. Coomes, P. Corona, K.C. Cushman, M. E.J. Cutler, J. W. Dalling, **M. Dalponte**, J. Dash, S. de-Miguel, S. Deng, P. Woods Ellis, B. Erasmus, P. A. Fekety, A. Fernandez-Landa, A. Ferraz, R. Fischer, A. G. Fisher, A. García-Abril, T. Gobakken, J. M. Hacker, M. Heurich, R. A. Hill, C. Hopkinson, H. Huang, S. P. Hubbell, A. T. Hudak, A. Huth, B. Imbach, K. J. Jeffery, M. Katoh, E. Kearsley, D. Kenfack, N. Kljun, N. Knapp, K. KralKljun, M. Krucek, N. Labrière, S. L. Lewis, M. Longo, R. M. Lucas, R. Main, J. A. Manzanera, R. Vásquez

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- Y. Zheng, S. Liu, Q. Du, H. Zhao, X. Tong, **M. Dalponte**, "A Novel Multitemporal Deep Fusion Network (MDFN) for Short term Multitemporal HR Images Classification," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, Vol. 14, 2021.
- E. Tusa, J.-M. Monnet, J.-B. Barré, M. Dalla Mura, **M. Dalponte**, J. Chanussot, "Individual Tree Segmentation Based on Mean Shift and Crown Shape Model for Temperate Forest," *IEEE Geoscience and Remote Sensing Letters*, Vol. 18, No. 12, 2021.
- H. O. Ørka, E. H. Hansen, **M. Dalponte**, T. Gobakken, E. Næsset, "Large-area inventory of species composition using airborne laser scanning and hyperspectral data," *Silva Fennica*, Vol. 55, No. 4, 2021.
- H. A. Imran, D. Gianelle, M. Scotton, D. Rocchini, **M. Dalponte**, S. Macolino, K. Sakowska, C. Pornaro, L. Vescovo, "Potential and Limitations of Grasslands α -diversity Prediction Using Fine-Scale Hyperspectral Imagery," *Remote Sensing*, Vol. 13, No. 14, 2021.
- P. Naik, **M. Dalponte**, L. Bruzzone, "Prediction of forest aboveground biomass using multitemporal multispectral remote sensing data," *Remote Sensing*, Vol. 13, No. 7, 2021.
- S. Liu, Y. Zheng, Q. Du, A. Samat, X. Tong, **M. Dalponte**, "A Novel Feature Fusion Approach for VHR Remote Sensing Image Classification," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, Vol. 14, pp. 464-473, 2021.
- S. Versace, V. Garfi, **M. Dalponte**, M. Di Febbraro, L. Frizzera, D. Gianelle, R. Tognetti, "Species interactions in pure and mixed-species stands of silver fir and European beech in Mediterranean mountains," *iForest*, Vol. 14, January 2021.
- M. Dalponte**, S. Marzini, Y. T. Solano-Correa, L. Vescovo, G. Tonon, D. Gianelle, "Mapping forest windthrows using high spatial resolution multispectral satellite images," *International Journal of Applied Earth Observations and Geoinformation*, Vol. 93, December 2020.
- H. A. Imran, D. Gianelle, D. Rocchini, **M. Dalponte**, M. P. Martín, K. Sakowska, G. Wohlfahrt, L. Vescovo, "VIS-NIR, Red Edge and NIR-Shoulder based Normalized Vegetation Indices response to co-varying grassland leaf and canopy structural traits," *Remote Sensing*, Vol. 12, No. 14., July 2020.
- B. Wedeux, **M. Dalponte**, M. Schlund, S. Hagen, M. Cochrane, L. Graham, U. Usup, A. Thomas, D.A. Coomes, "Dynamics of a human-modified tropical peat swamp forest revealed by repeat lidar surveys," *Global Change Biology*, Vol. 26, No. 7, pp. 3947-3964, July 2020.
- K. Stereńczak, G. Vaglio Laurin, G. Chirici, D. A. Coomes, **M. Dalponte**, H. Latifi, N. Puletti, "Global Airborne Laser Scanning Data Providers Database (GlobALS) – a new tool for monitoring ecosystems and biodiversity," *Remote Sensing*, Vol. 12, No. 11, June 2020.
- S. Liu, Y. Zheng, **M. Dalponte**, and X. Tong, "A Novel Fire Index based Burned Area Change Detection Approach Using Landsat-8 OLI Data," *European Journal of Remote Sensing*, Vol. 53, No. 1, pp. 104-112, March 2020.
- C. Sothe, C. M. de Almeida, M. B. Schimalski, L. E. C. la Rosa, J. D. B. Castro, R. Q. Feitosa, **M. Dalponte**, C. L. Lima, V. Liesenberg, G. T. Miyoshi, A. M. G. Tommaselli, "Comparative performance of convolutional neural network, weighted and conventional support vector machine and random forest for classifying tree species using hyperspectral and photogrammetric data," *GIScience & Remote Sensing*, Vol. 57, No. 3, pp. 369-394, January 2020.
- H. M. Nguyen, B. Demir, **M. Dalponte**, "A weighted SVM-based approach to tree species classification at individual tree crown level using lidar data," *Remote Sensing*, Vol. 11, No. 24, December 2019.

- S. Versace, D. Gianelle, L. Frizzera, R. Tognetti, V. Garfi, **M. Dalponte**, "Prediction of Competition Indices in a Norway Spruce and Silver Fir-dominated Forest Using Lidar Data," *Remote Sensing*, Vol. 11, No. 23, November 2019.
- S. Malek, F. Miglietta, T. Gobakken, E. Naesset, D. Gianelle, **M. Dalponte**, "Prediction of stem diameter and biomass at individual tree crown level with advanced machine learning techniques," *iForest - Biogeosciences and Forestry*, Vol. 12, No. 3, pp. 323-329, June 2019.
- C. Sothe, **M. Dalponte**, C. M. de Almeida, M. B. Schimalski, C. L. Lima, V. Liesenberg, G. Takahashi Miyoshi, A. M. Garcia Tommaselli, "Tree species classification in a highly diverse subtropical forest integrating UAV-based photogrammetric point cloud and hyperspectral data," *Remote Sensing*, Vol. 11, No. 11, June 2019.
- O. M. Bollandsås, H. O. Ørka, **M. Dalponte**, T. Gobakken, and E. Næsset, "Modelling Site Index in Forest Stands Using Airborne Hyperspectral Imagery and Bi-Temporal Laser Scanner Data," *Remote Sensing*, Vol. 11, No. 9, April 2019.
- S. Malek, F. Miglietta, T. Gobakken, E. Naesset, D. Gianelle, **M. Dalponte**, "Optimizing field data collection for individual tree attribute predictions using active learning methods," *Remote Sensing*, Vol. 11, No. 8, April 2019.
- M. Dalponte**, T. Jucker, S. Liu, L. Frizzera, and D. Gianelle, "Characterizing forest carbon dynamics using multi-temporal lidar data," *Remote Sensing of Environment*, Vol. 224, pp. 412-420, April 2019.
- K. Sakowska, A. MacArthur, D. Gianelle, **M. Dalponte**, G. Alberti, B. Gioli, F. Miglietta, A. Pitacco, F. Meggio, F. Fava, T. Julitta, M. Rossini, D. Rocchini, L. Vescovo, "Assessing across-scale optical diversity and productivity relationships in grasslands of the Italian Alps," *Remote Sensing*, Vol. 11, No. 6, March 2019.
- M. Dalponte**, L. Frizzera, and D. Gianelle, "Individual tree crown delineation and tree species classification with hyperspectral and LiDAR data," *PeerJ*, Vol 6. pp. e6227, January 2019.
- T. Jucker, G. P. Asner, **M. Dalponte**, P. Brodrick, C. D. Philipson, N. Vaughn, Y. A. Teh, C. Brelsford, D. F. R. P. Burslem, Deere, R. M. Ewers, J. Kvasnica, S. L. Lewis, Y. Malhi, S. Milne, R. Nilus, M. Pfeifer, O. L. Phillips, L. Qie, N. Renneboog, G. Reynolds, T. Riutta, M. J. Struebig, M. Svátek, E. C. Turner, and D. A. Coomes, "Estimating aboveground carbon density and its uncertainty in Borneo's structurally complex tropical forests using airborne laser scanning," *Biogeosciences*, Vol. 15, pp. 3811-3830, June 2018.
- M. Dalponte**, L. Frizzera, D. Gianelle, "How to map forest structure from aircraft, one tree at a time," *Ecology and Evolution*, 2018.
- T. Jucker, B. Bongalov, D. Burslem, R. Nilus, **M. Dalponte**, S. Lewis, O. Phillips, L. Qie, and D. Coomes, "Topography shapes the structure, composition and function of tropical forest landscapes," *Ecology Letters*, 2018.
- M. Dalponte**, L. T. Ene, T. Gobakken, E. Næsset, D. Gianelle, "Predicting Selected Forest Stand Characteristics with Multispectral ALS Data," *Remote Sensing*, Vol. 10, No. 4, 2018.
- M. Dalponte**, L. Frizzera, H. O. Ørka, T. Gobakken, E. Næsset, D. Gianelle, "Predicting stem diameters and aboveground biomass of individual trees using remote sensing data," *Ecological Indicators*, Vol. 85, pp. 367–376, February 2018.
- D. A. Coomes, D. Safka, J. D. Shepherd, **M. Dalponte**, R. Holdaway, "Airborne laser scanning of New Zealand reveals the influences of wind on forest carbon," *Forest Ecosystems*, Vol. 5, No. 10, January 2018.
- K. Kandare, H. O. Ørka, **M. Dalponte**, E. Næsset, T. Gobakken, "Individual tree crown approach for predicting site index in boreal forests using airborne laser scanning and hyperspectral data," *International Journal of Applied Earth Observation and Geoinformation*, Vol. 60, pp. 72-82, August 2017.
- D. A. Coomes, **M. Dalponte**, T. Jucker, G. P. Asner, L. F. Banin, D. F.R.P. Burslem, S. L. Lewis, R. Nilus, O. L. Phillips, M.-H. Phua, L. Qie, "Area-based vs tree-centric approaches to mapping forest carbon in Southeast Asian forests from airborne laser scanning data," *Remote Sensing of Environment*, Vol. 194, Issue 1, pp. 77-88, June 2017.
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