

Dr. Javier Enrique Guerra Cárcamo

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Academic qualifications

2013. **PhD in Forest Sciences.** Universidad Austral de Chile (UACH) & Universidad de Concepción (UC). Specialism: Natural resource evaluation by remote sensing. Thesis title: Radiometric characterization of infestation of *Sirex noctilio* on *Pinus radiata* and its detection by field radiometry.

2002. **BSc in Forestry Science & Forest Engineering.** Universidad Austral de Chile (UACH). Undergraduate thesis: Coarse root biomass of tree species *Nothofagus alpina* (Raulí).

1994. **Technician in Forest Science.** Universidad De Los Lagos – Osorno, Chile.

Employment

2008 – current. **Director and founder of CAMPODIGITAL Company.** I have created the independent research services company which advises and supports in research to private companies, public institutions and national and international NGO's. Our areas of research are remote sensing, biomass and climate change with conservation aims. So far we have supported research and developed methods for CONAF (Cooperación Nacional Forestal), INFOR (Instituto Forestal), private companies, Universities, and the british NGO Rainforest Concern. I give remote sensing lectures at the University of Los Lagos (Osorno, Chile) and Adolfo Matthei Agrarian Institute (Osorno, Chile).

2004 – 2007. **Environmental Management and Forest Certification Adviser** (Managing Forest conservation objectives, forest management for timber production), Carbon Capture Projects, Geographic Information Systems (GIS, GPS, satellite imagery, Remote Sensing).

1999 – 2003. **Research Assistant of Bosques Pro-Carbono (UACH).** Integrated forest production group and environment, also engages in project assistant on issues related to climate change and vegetation resources assessment for carbon sequestration. Biomass Inventory Project Baseline Carbon Capture UACH.

Significant Projects developed: Climate Change and Remote sensing:

- 2018–current. Biomass Allometry for shrub and small trees in secano region of Chile, and evaluation using remote sensing of drone and imagery of parrot sequoia camera. Research funded by INFOR.
- 2017–current. High Resolution Satellite Mapping in the Monkey Puzzle (*Araucaria araucana*) Nasampulli Reserve, Chile (owned by Rainforest Concern). Development of a GIS for Administration and Operations Evaluation of Parrot sequoia imagery for detection of *Araucaria araucana* in contrast with other satellite imagery
- 2012–2013. High Resolution Satellite Mapping of *Araucaria araucana* in La Fusta, Lonquimay, Region IX. Development of a GIS for Administration and Operations.
- 2012–2013. Evaluation of Carbono ad Biomass allometric function development in *Araucaria araucana* (36 Araucaria), *Nothofagus pumilio* (90 Lenga), *Nothofagus obliqua* (36 Roble). Research funded by CONAF.
- 2011. Detection of areas for afforestation in Aysén, compensation Areas Project Southern Energy Company Ltd. 10,000 hectares for afforestation Remote Sensing to availability and soil quality.
- 1999–2003. Biomass Accountability Project Capacity Measurement Fondeff carbon capture in forests of Chile and its promotion in foreign markets Chief operating. Were measured above ground biomass of 670 trees and 270 below ground biomass (coarse roots) of 19 species native and Exotic Forest present in Chile and Argentina.
- 2010–2011. High Resolution Satellite Mapping Projects Southern Energy Company in Aysén region. Support Environmental Impact Study (EIA), Environmental Permits Branch (PAS 102), Mensuration of natural resources and Hydropower Projects Forests classification in areas of interest.
- 2010. Remote sensing of water channels to central Rio Cuervo hydroelectric project, Rio Blanco and Rio Condor, Energia Austral Company. Application of remote sensing mixed methodologies.
- 2009–2011. High Resolution Satellite Mapping Mininco SA Forestry Company Aysen project. 15,000 ha of forest heritage high resolution especially difficult areas in the region.
- 2009. High Resolution Satellite Mapping Estancia Rio Swans. Coyhaique Premises. 142,000 hectares of high and medium resolution.

Statement

I am a forest engineer and doctor, with solid knowledge of remote sensing and GIS, and forest management. For the last 18 years I have been working in the Temperate Rainforest and Mediterranean vegetation of Chile. I started researching plant biomass and remote sensing through the laboratory of Forest Sciences at Austral University of Chile (UACH). I led a team of researchers in various projects related to carbon measurements, biomass of vegetal resources and remote sensing. Subsequently, I obtained a CONICYT scholarship for my PhD studies at UACH and Universidad de Concepcion. I developed classification methods using spectral radiometry for identification of plant species, structure, moisture and nutritional characteristics. My doctorate research was spectral analyses for determining plant health using remote sensing. I am driven by developing research in plant radiometry using spectroradiometers, linking the results to satellite measurements at different spatial resolutions, and comparison with data from multispectral cameras mounted on UAVs (which are Low cost and very applicable in all types of research).

For 10 years I have led my services and research company in natural resources that links companies and institutions of environmental research, water and biodiversity. We are currently developing research with multispectral cameras (parrot sequoia) mounted on drones, which have greatly facilitated the progress of classification of plant biodiversity, but are still in development. Due to financial constrain to running a business, I store a huge amount of data that I would like to publish and I hope this workshop might develop collaboration.

I am really enthusiastic to share my work and collaborate with others trying to address the major problems of remote sensing forest management for conservation and health. I would be delighted to have a place to participate in this workshop and built collaboration.

Selected publications

- GAYOSO A, J. y GUERRA C, J. 2005. Contenido de carbono en la biomasa aérea de bosques nativos en Chile. *Bosque* (Valdivia) 26 (2): 33-38. ISSN 0717-9200. [Carbon content in above ground biomass in Chilean Forest]
- GUERRA C, J; GAYOSO A, J, SCHLATTER V, J. & NESPOLO, R. 2005. Análisis de la biomasa de raíces en diferentes tipos de bosques: Avances en la evaluación de *Pinus radiata* en Chile. *Bosque* (Valdivia) 26 (1): 5-21. ISSN 0717-9200. Analysis of belowground biomass in different types of forest. [Advance in *Pinus radiata* in Chile]
- CALDERON, S. & GUERRA, J. 2002. Inventario de Biomasa y Contabilidad de Carbono. Universidad Austral de Chile. Proyecto Medición de la capacidad de captura de carbono en bosques de Chile y promoción en el mercado mundial. Valdivia 36p. [Biomass and carbon accounting]
- GAYOSO, J. & GUERRA, J. 2002. Contenido de carbono en la biomasa aérea de bosques nativos en Chile. Universidad Austral de Chile. Valdivia. 8p. [Carbon content in aboveground biomass in Chile's native forest]
- GAYOSO, J., J. GUERRA & D. ALARCON. 2002. Contenido de carbono y funciones de biomasa en especies nativas y exóticas. Universidad Austral de Chile. Proyecto Medición de la capacidad de captura de carbono en bosques de Chile y promoción en el mercado mundial. Informe Final, Documento N°1. Valdivia. 53p. [Carbon content and biomass equations in natives and exotics species in Chile]