

J. ANTONIO GUZMÁN Q.

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AFFILIATION:

Alberta Centre for Earth Observation Sciences
Department of Earth and Atmospheric Sciences
University of Alberta
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EDUCATION:

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| 2016-at present | <i>Ph.D.</i> candidate, Earth and Atmospheric Sciences
University of Alberta, Canada
(4/4 GPA) |
| 2015 | <i>M.Sc.</i> in Biology
Universidad de Costa Rica, Costa Rica
(8.96/10 GPA) |
| 2010 | <i>B.Sc.</i> in Biology with emphasis on Tropical Biology
Universidad Nacional de Costa Rica, Costa Rica
(8.46/10 GPA) |

AWARDS AND SCHOLARSHIPS:

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| 2018 - 2020 | <i>Scholarship: Vanier Canada Graduate Scholarship.</i> Natural Sciences and Engineering Research Council. Government of Canada. (CAN 150000) |
| 2018 - 2020 | <i>Award: President's Doctoral Prize of Distinction.</i> Faculty of Graduate Studies and Research. University of Alberta. (CAN 30000) |
| 2018 | <i>Award: Mary Louise Imrie Graduate Student Award.</i> Faculty of Graduate Studies and Research. University of Alberta. (CAN 1500) |
| 2018 | <i>Award: Academic Travel Award.</i> Graduate Students Association. University of Alberta. (CAN 500) |
| 2017 | <i>Award: Academic Travel Award.</i> Graduate Students Association. University of Alberta. (CAN 500) |
| 2016 - 2017 | <i>Scholarship: University of Alberta Doctoral Recruitment.</i> University of Alberta. (CAN 10000) |
| 2012 | <i>Award: Second place in the competition for best oral presentation at the graduate category by the conference: Crecimiento y fotosíntesis de brinzales de Cedrela salvadorensis Standl. (Meliaceae) sometidos a regímenes lumínicos contrastantes.</i> XVI Congreso de la Sociedad Mesoamericana para la Biología y la Conservación Panama City, Panama. |

2009 *Scholarship: Introduction to biological field research*, Smithsonian Tropical Research Institute Field Course, Panama. Full scholarship.

TEACHING EXPERIENCE:

2018 **Teaching assistant:** *Biogeography*. University of Alberta, Canada. - Oversaw biogeography labs.

2016-2017 **Teaching assistant:** *Geographic information systems*. University of Alberta, Canada. -Oversaw GIS laboratory.

2015-2016 **Teaching assistant:** *Tropical Ecology Field Course*. Organization for tropical studies. -Sole responsibility for the field biology course practices.

2012-2013 **Instructor:** *Plant Physiology*, Universidad de Costa Rica. -Sole responsibility for laboratory in plant physiology.

2010-2013 **Instructor:** *Biology*, Universidad de Costa Rica. -Sole responsibility for laboratory in general biology

2011-2013 **Teaching assistant:** *Ecology*, Universidad de Costa Rica. -Oversaw ecology laboratory and led discussion sections.

2010 **Teaching assistant:** *Plant Physiology and Anatomy*, Universidad Nacional de Costa Rica. -Oversaw the physiology laboratory and led discussion sections.

STUDENT CO-SUPERVISION

2016 Humberto Gonzalez, Bachelor's with major in Resource management; Distance State University, Costa Rica.

2017 Jose Lopez, Bachelor in Tropical Biology, National University of Costa Rica.

PUBLICATIONS:

In prep. **Guzmán, JA.**, Sharp, I. Alexandro, F., Sánchez-Azofeifa, GA. On the relationship of the fractal geometry and tree-stand metrics on point clouds derived from Terrestrial Laser Scanning.

2020 **Guzmán, JA.**, Laasko, K., Lopez, J., Rivard, B., Sánchez-Azofeifa, GA., Using visible-near-infrared spectroscopy to classify lichens at a Neotropical dry forest. *Ecological Indicators*. 111:10599.

2019 **Guzmán, JA.**, Sánchez-Azofeifa, GA., Espírito-Santo, MM. MODIS and PROBA-V NDVI products differ when compared with observations from phenological towers at four tropical dry forests in the Americas. *Remote Sensing*. 11: 2316.

- 2018 **Guzmán, JA.**, Rivard, B., Sánchez-Azofeifa, GA. Discrimination of liana and tree leaves from a Neotropical Dry Forest using visible-near infrared and longwave infrared reflectance spectra. *Remote Sensing of the Environment*. 219: 135-144.
- 2018 **Guzmán, JA.**, Sánchez-Azofeifa, GA., Rivard, B. Differences in leaf temperature between lianas and trees in the Neotropical canopy. *Forest*. 9(6) 307.
- 2017 Rankine, C., Sánchez-Azofeifa, GA., **Guzmán, JA.**, Espirito Santo, M., Sharp, I. Comparing MODIS and Near-Surface Vegetation Indexes for monitoring tropical dry forest phenology along a successional gradient using optical phenology towers. *Environmental Research Letters*. 12(10): 105007
- 2017 Sánchez-Azofeifa, GA, **Guzmán, JA.**, Campos, CA, Castro, S., Garcia-Millan, V., Nightingale, J, Rankine, C. Twenty-first century remote sensing technologies are revolutionizing the study of tropical forests. *Biotropica*. 49(5): 604-619.
- 2017 Sánchez-Azofeifa, GA., **Guzmán, JA.**, Vega-Araya, M., Campos-Vargas, C., Durán, S., D'Souzaa, N., Gianoli, T., Portillo-Quintero, C., Sharpa, I. Can Terrestrial Laser Scanner (TLS) and hemispherical photographs predict Tropical Dry Forest Succession with liana abundance?. *Biogeosciences*. 14(4): 977-988
- 2016 **Guzmán, JA.**, Cordero, RA. 2016. Neighborhood structure and light availability influence the variations in plant design of shrubs in two cloud forests of different successional status. *Annals of Botany*. 118(1): 23-24.
- 2016 **Guzmán, JA.**, Cordero, RA. 2016. Neighborhood structure influences the convergence in light capture efficiency and carbon gain: An architectural approach for cloud forest shrubs. *Tree Physiology*. 36(6): 712-724.
- 2016 **Guzmán, JA.**, Cordero, RA., Corea, E. Biomass allocation and gas exchange are affected by light conditions in endangered *Cedrela salvadorensis* (Meliaceae) seedlings. *International Journal of Tropical Biology and Conservation*. 64(3): 1143-1154.
- 2015 **Guzmán, JA.**, Vega, H. 2015. Is forest cover conserved and restored by protected areas?: The case of two wild protected areas in the Central Pacific of Costa Rica. *International Journal of Tropical Biology and Conservation*. 63(3):579-590.
- 2015 **Guzmán, JA.** 2015. Ecological advantage of the leaf heteroblasty traits in *Costus pulverulentus* (Costaceae). *Botany*. 93(3): 151-158.
- 2014 **Guzmán, JA.**, Rodríguez-Corrales. 2014. Efecto de la regeneración del bosque nuboso sobre la morfología floral y polinización del arbusto

heterostílico *Palicourea padifolia* (Rubiaceae). *Cuadernos de Investigacion UNED*. 6: 197-204.

- 2013 **Guzmán, JA.**, Cordero, RA. 2013. Growth and photosynthetic performance of five tree seedlings species in response to natural light regimes from the Central Pacific of Costa Rica. *International Journal of Tropical Biology and Conservation*. 3: 1433-1444.

SCIENTIFIC CONFERENCES PRESENTATIONS:

- 2019 **Guzmán, JA.**, Sharp, I., Alencastro, F., Sánchez-Azofeifa, GA. *Estimation of tree and stand volume on point clouds derived from TLS using fractal geometry*. SilviLaser – Foz do Iguacu, Brazil. (Oral presentation).
- 2019 **Guzmán, JA.**, Sharp, I., Alencastro, F., Sánchez-Azofeifa, GA. *Relationship between tree architectural metrics and its fractal dimension using Terrestrial Laser Scanning*. Terrestrial Laser Scanning in Forest Ecology - Gent, Belgium (Poster presentation)
- 2018 **Guzmán, JA.**, Sánchez-Azofeifa, GA., Rivard, B. *Prediction of leaf functional traits of lianas and trees of the Neotropical Dry Forest using mid- and long-wave infrared reflectance*. European Geosciences Union General Assembly 2018. Vienna, Austria. (Oral Presentation)
- 2018 **Guzmán, JA.**, Sánchez-Azofeifa, GA. *NDVI product errors from MODIS and Prova-V at three Neotropical Dry Forests*. Land Product Validation and Evolution Workshop – European Space Agency. Frascati, Italy. (Poster presentation)
- 2017 **Guzmán, JA.**, Sánchez-Azofeifa, GA., Rivard, B. *Classification of lianas and trees using visible-near infrared or longwave Infrared reflectance: new perspectives for forest mapping*. HypsIRI workshop – NASA JPL. California Institute of Technology (Oral presentation).
- 2015 **Guzmán, JA.**, Cordero, RA. *Convergencia de la eficiencia de la captura de luz y la ganancia de carbono por asimetría de vecindarios arbóreos: Un enfoque arquitectónico para arbustos del bosque nuboso*. Primer Semana del Posgrado en Ciencias Biológicas y Afines, University of Costa Rica (Oral presentation).
- 2014 **Guzmán, JA.**, Cordero, RA. *Patrones de crecimiento, morfológicos y fotosintéticos de tres variedades de café (Coffea arabica L.) frente a dos regímenes lumínicos*. IV Semana de Ciencias Biológicas, Universidad Nacional de Costa Rica (Oral presentation).
- 2013 **Guzmán, JA.** *Why do plants present heterophylly? The case of the leaf functional traits of Costus pulverulentus (Costaceae)*. New Frontiers in

Tropical Biology, the next 50 Years, 1963-2013. ATBC & OTS (Oral presentation).

- 2013 Cordero, RA., **Guzmán, JA.**, Vargas, GG., Hidalgo-Mora, J., Corea, E. *Variation in growth and gas exchange among endangered tree species.* New Frontiers in Tropical Biology, the next 50 Years, 1963-2013. ATBC & OTS (Poster presentation).
- 2013 **Guzmán, JA.**, Vega, H. *Cambio en el uso del suelo del Parque Nacional La Cangreja y el Refugio de Vida Silvestre Rancho Mastatal: caso de estudio 1997-2005-2010.* IV Semana de Ciencias Biológicas, Universidad Nacional de Costa Rica (Oral presentation).
- 2012 **Guzmán, JA.**, Cordero, RA., Corea, E. *Crecimiento y fotosíntesis de brinzales de Cedrela salvadorensis Standl. (Meliaceae) sometidos a regímenes lumínicos contrastantes.* XVI Congreso de la Sociedad Mesoamericana para la Biología y la Conservación (Oral presentation).
- 2012 **Guzmán, JA.** *Características funcionales de las hojas de Costus pulverulentus a lo largo de la copa.* III Semana de Ciencias Biológicas, Universidad Nacional de Costa Rica (Oral presentation).
- 2011 **Guzmán, JA.**, Cordero, RA. *Plasticidad fenotípica en respuesta a regímenes lumínicos de cinco especies forestales nativas del Pacífico Central de Costa Rica.* II Semana de Ciencias Biológicas, Universidad Nacional de Costa Rica (Oral presentation).

SOFTWARE DEVELOPMENT

2018- until **Guzmán, JA.**, Hernandez, R., Sánchez-Azofeifa, GA. *rTLS: A package to now compute different metrics from Terrestrial Laser Scanner data.*
<https://github.com/Antguz/rTLS>

EXPERIENCE AS A JOURNAL REFEREE

Reviewer Tree physiology
Oecologia
Sensors
Canadian Journal of Remote Sensing
Journal of Vegetation Science
Biotropica
Journal of Forestry Research
Plant Science Today
International Journal of Tropical Biology and Conservation
Revista de Ciencias Ambientales

KNOWLEDGE IN SOFTWARE

OS: Windows, Linux Ubuntu, Mac
Data processing software: Windows Office, R, C++
Software for data analysis: R, JMP, Past, Sigmaplot 12
Software for geographic information systems: ArcGIS 10, QGIS 2.0

REFERENCES

Arturo Sanchez-Azofeifa, *Ph.D.* PEng, SM IEEE
Professor, Earth and Atmospheric Sciences Department
University of Alberta, gasanche@ualberta.ca

Roberto A. Cordero Solórzano, *Ph.D.*
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Universidad Nacional de Costa Rica, Heredia, Costa Rica, ticolamb@gmail.com