

JORGE A. VILLA
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University of Louisiana at Lafayette
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EDUCATION

Ohio State University	Columbus, OH, USA
Ph.D. , Environmental Sciences	2014
<i>Dissertation</i> : “Carbon Dynamics of Subtropical Wetland Communities in South Florida”	
<i>Committee</i> : William J. Mitsch (<i>Advisor</i>), Gil Bohrer, James Bauer, Jay Martin.	
Universidad Nacional de Colombia	Medellín, Colombia
M.Sc. , Forests and Environmental Conservation	2008
<i>Dissertation</i> : “Monitoring and modeling of the hydrological dynamics of wetland created in alluvial gold mining operations”. <i>Advisor</i> : Conrado Tobón	
Escuela de Ingeniería de Antioquia	Envigado, Colombia
B.Eng. Environmental Engineering	2003

TEACHING AND RESEARCH POSITIONS

Assistant Professor, School of Geosciences University of Louisiana at Lafayette	1/2020-present
Visiting Assistant Research Professor, Dept. Civil, Env. & Geo. Engineering The Ohio State University	2/2018-12/2019
Assistant Professor, Faculty of Engineering Corporación Universitaria Lasallista, Caldas, Colombia	7/2014-2/2018
Head of the Environmental Applied Research Group Corporación Universitaria Lasallista, Caldas, Colombia	1/2017-3/2018
Coordinator of the ‘Seedbed for Scientists’ in Environmental Research Corporación Universitaria Lasallista, Caldas, Colombia	7/2014-12/2016
Adjunct Faculty, Forests and Environmental Conservation Graduate Program Universidad Nacional de Colombia, Medellín, Colombia	8/2015-5/2016
Graduate Research Assistant, Environmental Sciences Graduate Program. The Wilma H. Schiermeier Olentangy River Wetland Research Park (OSU) Everglades Wetland Research Park, Naples Botanical Garden	9/2010-5/2014
Adjunct Instructor, Faculty of Engineering Universidad EAFIT, Medellín, Colombia	7/2009-11/2009
Part-time Faculty, Faculty of Engineering Corporación Universitaria Lasallista, Caldas, Colombia	2/2009-12/2009

RESEARCH FUNDING

Active grants

- Genomic Science Program 9/2022-8/2025
US Department of Energy
“Decoding the Unifying Microbial Metabolic Controllers on Soil Carbon Cycling Across Freshwater Wetlands”
Co-PI with Kelly Wrighton (PI), Bailey Fosdick, Michael Wilkins – Colorado State U, Gil Bohrer – Ohio State U, Yu-Ping Chin – University of Delaware, Sheel Bansal – USGS Northern Prairie Wildlife Research Center, Eric Ward – USGS Wetland and Aquatic Research Center, William Riley – Lawrence Berkeley National Laboratory, and Christopher Henry – Argonne National Laboratory; \$399,380
- Environmental System Science Program 7/2022-6/2027
US Department of Energy
“Assessing greenhouse gas structural and functional resilience of freshwater coastal wetlands subject to persistent saltwater intrusion events”
PI; \$749,956.
- Large-Scale EMSL Research Program (Lab resources grant) 10/2021-9/2023
US Department of Energy
“Incorporating hydrologic and microbial processes into carbon budgets from coastal wetland soils”. Co-PI, with Kelly Wrighton (PI) – Colorado State U, Rebecca Daly – Colorado State U, Timothy Morin – SUNY ESF, Eric Ward – USGS WARC, and Gil Bohrer – OSU; (Genome sequencing laboratory resources, \$140,739 in kind).
- Graduate Studentship 9/2021-8/2023
RESTORE Act Center of Excellence for Louisiana
“Patch-scale effects of acute saltwater intrusion on carbon fluxes in a simulated coastal freshwater marsh environment” PI with Diana Taj (Co-PI, GRA); \$86,250.
- Terrestrial Ecosystem Science Program 10/2020-9/2024
US Department of Energy
“Functional-type modeling approach and data-driven parameterization of methane emissions in wetlands”
Co-PI, with Gil Bohrer (PI) – OSU, Kelly Wrighton – Colorado State U, William Riley – Lawrence Berkeley National Laboratory, Eric Ward – US Geological Service Wetland and Aquatic Research Center; \$ 215,545 Villa.
- Completed projects**
- US Geological Survey 6/2022-5/2022
“Assessing the effects of saltwater intrusion in forest structure and root functioning of cypress swamps in the Barataria Basin”
PI; \$26,927
- Technology Innovation & Research Exploratory (TIRE) Program 7/2021-6/2022
Louisiana Transportation Research Center
“Enhancing the carbon dioxide sequestering capacity of Louisiana highway right of way lands”
PI with Dhan Lord Fortela, Mark Zappi & Sheila Holmes – UL Lafayette; \$ 10,492.
- Community Science Program (Lab resources grant) 10/2018-9/2021
US Department of Energy - Joint Genome Institute
“From genomes to updated biogeochemical models: Targeting critical knowledge gaps in wetland soils” Co-PI, with Kelly Wrighton (PI) – Colorado State U, Christopher Miller – UC Denver, Timothy Morin – SUNY ESF, Lauren Kinsman-Costello – Kent State U, Matthew Sullivan and Gil

Bohrer – OSU; (Genome sequencing laboratory resources, \$220,000 in kind).

Ohio Water resources Center 7/2019-12/2020
The Ohio State University
“Linking wetland ecological functions: towards a combined-ecosystem service quantification to promote ecosystem health in Lake Erie”. Co-PI with Gil Bohrer (OSU); \$39,710.

Intramural Research Grant 2/2015-2/2016
Corporación Universitaria Lasallista
“Climate change perceptions in the rural area of the Caldas municipality”
Co-Investigator with Cristian Ramírez (PI); \$10,203.

Marine Sciences and Hydrobiological Resources Program Grant 7/2016-7/2018
COLCIENCIAS
“Carbon capture and emissions in wetlands of the lowlands of the Magdalena River”
Co-PI, with Flavio H. Moreno (PI) – Universidad Nacional de Colombia; \$101.061.

Marine Sciences and Hydrobiological Resources Program Grant 2/2015-
2/2018 COLCIENCIAS
“Carbon accumulation and methane emissions in a tropical alpine wetland in Belmira, Antioquia”
PI; \$133,580.

AWARDS AND FELLOWSHIPS

US Department of Energy - Office of Science 2022-2027
Environmental Systems Science Early Career Award

Corporación Universitaria Lasallista, Council of the Engineering Faculty 2017
Excellence in Teaching Recognition

Society of Wetland Scientists & RAMSAR 2011
Student Research Award

COLCIENCIAS 2010-2014
Scholarship for Graduate Studies Abroad
“Generación del Bicentenario Francisco José de Caldas” Scholarship

Universidad Nacional de Colombia 2007
Graduate Student Research Grant
“Wetland Creation: An Approach to the Study of Hydrological Functioning and Water Quality”

PUBLICATIONS

Peer-reviewed journal papers (*denotes undergraduate/graduate students I mentored):

1. **Villa JA**, Bohrer G, Ju Y, Wrighton K, Johnson N, Kinsman-Costello L. **2023**. Carbon sequestration and nitrogen and phosphorus accumulation in a freshwater, estuarine marsh: Effects of microtopography and nutrient loads. *Geoderma*, 430, 116349. <https://doi.org/10.1016/j.geoderma.2023.116349>
2. Chen K, Chen X, Stegen JC, **Villa JA**, Bohrer G, Song X, Chang K-Y, Kaufman M, Liang X, Guo Z, Roden EE, Zheng C. **2023**. Vertical Hydrologic Exchange Flows Control Methane Emissions from Riverbed Sediments. *Environ. Sci. Technol.* 57, 4014–4026. <https://doi.org/10.1021/acs.est.2c07676>
3. Morin TH, Riley WJ, Grant RF, Mekonnen Z, Stefanik KC, Sanchez ACR, Mulhare MA, **Villa JA**, Wrighton K, Bohrer G. **2022**. Water level changes in Lake Erie drive 21st century CO₂ and CH₄ fluxes from a coastal temperate wetland. *Science of The Total Environment* 153087. <https://doi.org/10.1016/j.scitotenv.2022.153087>
4. **Villa JA**, Ju Y, Yazbeck T, Waldo S, Wrighton KC, Bohrer G. **2021**. Ebullition dominates methane fluxes from the water surface across different ecohydrological patches in a temperate freshwater marsh

- at the end of the growing season. *Science of the Total Environment*, 767: 144498. <https://doi.org/10.1016/j.scitotenv.2020.144498>
5. **Villa JA. 2020.** Functional representation of biological components in methane-cycling processes in wetlands improves modeling predictions. *JGR Biogeosciences* 125, e2020JG005794. <https://doi.org/10.1029/2020JG005794>
 6. **Villa JA, Ju Y, Stephen T*, Rey-Sanchez C, Wrighton KC, Bohrer G. 2020.** Plant-mediated transport in emergent and floating-leaved species of a temperate freshwater mineral-soil wetland. *Limnology and Oceanography*, 65: 1635-1650. <https://doi.org/10.1002/lno.11467>
Publication featured in *Nature Research Highlights*.
 7. Russell SJ, Vines CD, Bohrer G, Johnson DR, **Villa JA**, Heltzel R, Rey-Sanchez C, Matthes JH. **2020.** Quantifying CH₄ concentration spikes above baseline and attributing CH₄ sources to hydraulic fracturing activities by continuous monitoring at an off-site tower. *Atmospheric Environment*, 228: 117452. <https://doi.org/10.1016/j.atmosenv.2020.117452>
 8. **Villa JA, Smith GJ, Renteria L, Angle JC, Arntzen E, Harding SF, Ren H, Chen X, Sawyer AH, Graham EB, Stegen JC, Wrighton KC, Bohrer G. 2020.** Methane and nitrous oxide porewater concentrations and surface fluxes of a regulated river. *Science of the Total Environment*, 715: 136920. <https://doi.org/10.1016/j.scitotenv.2020.136920>
 9. **Villa JA, Ju Y, Rey-Sanchez C, Morin TH, Wrighton KC, Bohrer G. 2019.** Relationships between methane and carbon dioxide fluxes in a temperate cattail-dominated freshwater wetland. *JGR Biogeosciences*. 124: 2076–2089. <https://doi.org/10.1029/2019JG005167>
 10. Pérez Rojas JJ*, Moreno F, Quevedo JC*, **Villa JA. 2019.** Soil carbon stocks in fluvial and isolated tropical wetlands from Colombia. *Catena*, 179: 139–148. <https://doi.org/10.1016/j.catena.2019.04.006>
 11. **Villa JA, Mejia GM, Velasquez D*, Botero A*, Acosta SA*, Marulanda JM*, Osorno AM*, Bohrer G. 2019.** Carbon sequestration and methane emissions along a microtopographic gradient in a tropical Andean peatland. *Science of the Total Environment*, 654: 651–661. <https://doi.org/10.1016/j.scitotenv.2018.11.109>
 12. **Villa JA, Bernal B. 2018.** Carbon sequestration in wetlands, from science to practice: An overview of the biogeochemical process, measurement methods, and policy framework. *Ecological Engineering*, 114:115–118. <https://doi.org/10.1016/j.ecoleng.2017.06.037>
 13. Veber G, Kull A, **Villa JA**, Maddison M, Paal J, Oja T, Iturraspe R, Pärn J, Teemusk A, Mander Ü. **2018.** Greenhouse gas emissions in natural and managed peatlands of America: Case studies along a latitudinal gradient. *Ecological Engineering*, 114:34–45. <https://doi.org/10.1016/j.ecoleng.2017.06.068>
 14. Parn J, Verhoeven J, Butterbach-Bahl K, Dise N, Ullah S, Aasa A, Egorov S, Espenberg M, Järveoja J, Jauhainen J, Kasak K, Klemmedtsson L, Kull A, Laggoun-Défarge F, Lapshina E, Lohila A, Lõhmus K, Maddison M, Mitsch WJ, Müller M, Niinemets Ü, Osborne B, Pae T, Salm J-O, Sgouridis F, Sohar K, Soosaar K, Storey K, Teemusk A, Tenywa M, Tournebize J, Truu J, Veber V, **Villa JA**, Zaw S, Mander Ü. **2018.** Nitrogen-rich organic soils under warm well-drained conditions are global nitrous oxide emission hotspots. *Nature Communications*, 9:1135. <https://doi.org/10.1038/s41467-018-03540-1>
 15. **Villa JA, 2017.** Evidence of increased soil organic matter accumulation in a tropical alpine wetland after cattle removal. *Ecological Restoration*, 35:213–217. <https://doi.org/10.3368/er.35.3.213>
 16. **Villa JA, Mitsch WJ, 2014.** Carbon sequestration in different wetland plant communities in the Big Cypress Swamp region of southwest Florida. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 11:17–28. <https://doi.org/10.1080/21513732.2014.973909>
 17. **Villa JA, Mitsch WJ, Song K, Miao S. 2014.** Contribution of different wetland plant species to the DOC exported from a mesocosm experiment in the Florida Everglades. *Ecological Engineering*, 71:118–125. <https://doi.org/10.1016/j.ecoleng.2014.07.011>
 18. **Villa JA, Mitsch WJ, 2014.** Methane emissions from five wetland plant communities with different hydroperiods in the big cypress region of Florida Everglades. *Ecology and hydrobiology*, 14:253–266. <https://doi.org/10.1016/j.ecohyd.2014.07.005>
 19. **Villa JA, Tobón C, 2012.** Modeling hydrologic dynamics of a created wetland, Colombia. *Ecological Engineering*, 40:173–182. <https://doi.org/10.1016/j.ecoleng.2011.12.005>

Citable datasets

20. **Villa JA**, Bohrer G, Kinsman-Costello L, Ju Y. **2022**. Nutrient and carbon concentrations in dated soil cores at US-OWC Ameriflux wetland site (OWC NERR). Functional-type modeling approach and data-driven parameterization of methane emissions in wetlands, *ESS-DIVE repository*. [doi:10.15485/1839288](https://doi.org/10.15485/1839288)
21. Bohrer G, Kerns J, Morin TH, Rey-Sanchez AC, **Villa JA** and Yang J. **2020**. *FLUXNET-CH4 US-OWC Old Woman Creek*. [doi:10.18140/FLX/1669690](https://doi.org/10.18140/FLX/1669690)
22. **Villa JA**, Ju Y, Smith GJ., Angle JC, Renteria L, Arntzen E, Harding SF, Stegen JC, Wrighton KC, Bohrer G. **2020**. Chamber Flux and Porewater Concentration of CH₄, CO₂ and N₂O, 2018, Columbia River bank at the Hanford site, WA, USA. *Accounting for hydrological and microbial processes on greenhouse gas budgets from river systems*, *ESS-DIVE repository*. [doi:10.15485/1595105](https://doi.org/10.15485/1595105)
23. Bohrer G, Ju Y, Arend K, Morin T, Rey-Sanchez C, Wrighton KC, **Villa JA**. **2019**. Methane and CO₂ chamber fluxes and porewater concentrations US-OWC Ameriflux wetland site, 2015-2018. *AmeriFlux Management Project*, *ESS-DIVE repository*. [doi:10.15485/1568865](https://doi.org/10.15485/1568865)

Book chapter

24. Pärn J, Aasa A, Egorov S, Filippov I, Gabiri G, Gheorghe I, Järveoja J, Kasak K, Laggoun-Défarge F, Luswata C, Maddison M, Mitsch W, Óskarsson H, Pellerin S, Salm J-O, Sohar K, Soosaar K, Teemusk A, Tenywa M, **Villa JA**, Vohla C, Mander Ü. **2015**. Global Boundary Lines of N₂O and CH₄ Emission in Peatlands, in: Vymazal, J. (Ed.), *The Role of Natural and Constructed Wetlands in Nutrient Cycling and Retention on the Landscape*. Springer International Publishing, pp. 87–102 .

Peer-reviewed conference abstract

25. Bohrer G, Ju Y, **Villa JA**. **2022**. The role of ecohydrological patch types in carbon sequestration and nutrient uptake rate a lake estuarine wetland experiencing rapid water-level rise. *EGU General Assembly Conference Abstracts*, <https://doi.org/10.5194/egusphere-egu22-1007>
26. Mitsch WJ, **Villa JA**, Li X, Marchio D, Pereyra A, Cabezas A, Zhang L. **2017**. Comparison of carbon sequestration and methane emissions in different hydrologic and disturbance conditions in subtropical wetlands. *EGU General Assembly Conference Abstracts*, 19:4144.

Other publications with a Country-level or Latin-American scope

27. Arroyave-Maya MP, **Villa JA**, Posada-Posada MI, Echandía-Arbelaéz AF. **2017**. Servicios ecosistémicos. In: Benjumea-Hoyos et al., (Eds), *Estado del recurso hídrico en Antioquia 2012-2015*. CTA, Medellín, pp. 37–63. ISBN: 978-958-8470-42-9.
28. **Villa JA**. **2018**. Flujos de carbono en un humedal de alta montaña. In: Caselles-Osorio A, Marçal S.F., Ovando XMC, Posada García JA, (Eds.), *Humedales tropicales, especies invasoras y salud*. On-line, pp. 66–77. ISBN 978-958-48-3828-5.
29. **Villa JA**. 2017. Wetlands classification in alluvial mining zones. *Producción + Limpia* 12: 59–69.
30. Acosta-Rojas SA*, **Villa JA**. **2016**. *Trichoderma spp* evaluation as a biologic control in a small cocoa crop. *Journal of Agriculture and Animal Sciences - Corporación Universitaria Lasallista*, 5:10–20.
31. Acosta-Rojas SA, **Villa JA**. **2016**. Evaluating a mixture of lixiviate and *Trichoderma spp.* as biological control of *Moniliophthora roreri* in a small-scale cacao (*Theobroma cacao*) farm. *Vitae - Revista de la Facultad de Ciencias Farmacéuticas y Alimentarias*, 23:S200–S201.
32. Marulanda J*, **Villa JA**. **2015**. Apparent density and concentration of organic matter in the soil of a high mountain wetland. *Journal of Engineering and Technology – Corporación Universitaria Lasallista*, 4:8–20.
33. Botero A*, **Villa JA**. **2016**. Determinación de la humificación de la materia orgánica en el suelo de un humedal de alta montaña en un gradiente de niveles de agua, in: *Jóvenes Investigando Con Sentido, Jovial*. Editorial Lasallista, Caldas, pp. 439–444.
34. Acosta-Rojas SA*, **Villa JA**. **2016**. Actividad de la enzima fenol oxidasa en el suelo de un humedal de alta montaña del páramo de Belmira (Antioquia), in: *Jóvenes Investigando Con Sentido, Jovial*.

Editorial Lasallista, Caldas, pp. 489–496.

35. Acosta-Rojas SA*, **Villa JA. 2015.** Control biológico como alternativa en enfermedades de plantas, in: *Dinámicas Actuales de Investigación. Los Jóvenes Buscan y Descubren*. Editorial Lasallista, Caldas, pp. 213–220.
36. Bermúdez-Hincapié J*, Saldarriaga-Rendón LF*, **Villa JA. 2015.** Viabilidad técnica y económica de filtros caseros para mejorar la calidad de aguas de suministro, parcialmente tratadas, in: *Dinámicas Actuales de Investigación. Los Jóvenes Buscan y Descubren*. Editorial Lasallista, Caldas, pp. 155–162.
37. Yepes AP, **Villa JA. 2010.** Sucesión vegetal luego de un proceso de restauración ecológica en un fragmento de bosque seco tropical (La Pintada, Antioquia). *Revista Lasallista de Investigación*, 7:24–34.

INVITED PRESENTATIONS & PANELS

1. **Villa JA.** Assessing Greenhouse Gas Structural and Functional Resilience of Freshwater Coastal Wetlands Subject to Persistent Saltwater Intrusion Events. Speaker & panelist: Early career panel. 5/2023. *Department of Energy – Office of Biological and Environmental Research, 2018 Environmental System Science PI Meeting* (Bethesda, MD).
2. **Villa JA.** Structure and function associated with greenhouse gas fluxes in coastal wetlands. Speaker and Panelist: “Coastal and Terrestrial Aquatic Interfaces”. 5/2023. *Department of Energy – Office of Biological and Environmental Research, 2018 Environmental System Science PI Meeting* (Bethesda, MD).
3. **Villa JA.** Wetlands, methane, and climate change: Moving beyond the single patch-type denomination in wetland models. 11/2020. *Science Interdisciplinary Monthly Meeting, College of Sciences - University of Louisiana* (Lafayette, LA).
4. **Villa JA.** Partitioning methane emission pathways in ecohydrological patches of a freshwater marsh: Implications for functional wetland restoration on the coast of Lake Erie. 2/2020. *Biology Colloquium, Department of Biology - University of Louisiana* (Lafayette, LA).
5. **Villa JA.** The role of plant communities in greenhouse gas fluxes at Old Woman Creek. Speaker & Panelist: “Management-driven research”. 10/2019. *Old Woman Creek National Estuarine Research Reserve Research Symposium and Open House* (Huron, OH).
6. **Villa JA.** Carbon sequestration and methane emissions in a tropical alpine wetland along a water table gradient. 2018/05. *SWS annual meeting* (Denver, CO).
7. **Villa JA.** Carbon accumulation in wetlands: some insights for management and conservation. 2/2016. *RAMSAR world wetlands day celebration. Universidad de Antioquia* (Medellín, COL).
8. **Villa JA, Mitsch WJ.** Methane emissions from different wetland plant communities in the big cypress swamp. 11/2012. *4th annual research symposium, Big Cypress National Preserve* (Ochopee, FL).
9. **Villa JA.** Carbon sequestration in wetlands, measurements, and applied studies. 11/2012. *Ecohydrology Institute* (Davis, CA).

CONFERENCE PRESENTATIONS

**denotes undergraduate/graduate students I mentor(ed)*

10. Ward E, Bansal S, Bohrer G, Daniel C, Krauss K, Kroeger K, Reed S, Sleeter B, Stagg C, Windham-Myers L, **Villa JA, Zhu Z.** Challenges and opportunities for monitoring and modeling ecosystem management as a nature-based climate solution along a dryland to wetland spectrum. 8/2023. *ESA Annual Meeting* (Portland, OR).
11. Ray N, Cooper P, Heathcote A, Anderson NJ, **Villa JA, Downing J, Holgerson M.** An updated estimate of the global lentic carbon sink. 6/2023. *ASLO Aquatic Sciences Meeting* (Palma de Mayorca, ESP).
12. Martinez M, Middleton BA, Bordelon R*, **Villa JA.** Methane emissions from bald cypress knees across a latitudinal gradient. 6/2023. *Society of Wetlands Scientists Annual Meeting* (Spokane, WA).
13. Taj D*, Bordelon R*, Blanchard M*, Stoll J*, Marcantel M*, **Villa JA.** The Effects of Acute

- Saltwater Intrusion Events on Methane and CO₂ Fluxes from *Typha domingensis* and *Panicum hemitomon* Wetland Vegetation Patches. 6/2023. *Society of Wetlands Scientists Annual Meeting* (Spokane, WA).
14. Bordelon R*, Taj D*, **Villa JA**. Assessing Changes in Methane Flux from a South Louisiana Oligohaline Marsh via Leaf-Level Spectral Analysis. 6/2023. *Society of Wetlands Scientists Annual Meeting* (Spokane, WA).
 15. Brovold C*, Huval AM*, Gottardi R, Oppo D, Schubert B, **Villa JA**. Organic Matter Quantity and Composition After a Storm Surge Event in Coastal Louisiana. 5/2023. *State of the Coast* (New Orleans, LA).
 16. Yazbeck T, Bohrer G, Ju Y, Shcheglov O, Scyphers M, Missik J, Ward E, Bordelon R, Taj D, **Villa JA**, Zhu Q, Riley WJ. Reduce methane estimation uncertainty in earth system models by including eco-hydrological patch types sub-grid representation coupled with HLS-derived within-wetland patch distribution. 1/2023. *American Meteorological Society Annual Meeting* (Denver, CO).
 17. Yazbeck T, Bohrer G, Ju Y, Scyphers M, Missik J, Ward E, Bordelon R, Taj D, **Villa JA**, Zhu Q, Riley WJ. Reduce methane estimation uncertainty in earth system models by including eco-hydrological patch types sub-grid representation coupled with HLS-derived within-wetland patch distribution. 3/2023. *Carbon Cycle & Ecosystems Joint Science Workshop* (College Park, MD).
 18. **Villa JA**, Bohrer G, Ju Y, Kinsman-Costello LE, N Johnson. Increasing Nitrate Loads Reduces Carbon Sequestration, Nitrogen, and Phosphorus Accumulation on a Freshwater, Estuarine Marsh. 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 19. Taj D*, Bordelon R* and **Villa JA**. The Effects of a Simulated Saltwater Intrusion Event on CO₂ Leaf Fluxes and Porewater Concentrations from *Typha domingensis* Vegetation Patches in a Freshwater Environment. 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 20. Brovold C*, Huval AM*, Gottardi R, Oppo D, Schubert B, **Villa JA**. Salt Tectonics Affects Organic Matter Quality and Quantity of a Coastal Wetland in Southwest Louisiana. 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 21. Ward EJ, Bansal S, Bohrer G, Daniel C, Krauss K, Kroeger KD, Sleeter BM, LaFosse Stagg C, Windham-Myers L, **Villa JA**. Challenges and Opportunities for Monitoring and Modeling Wetland Management as a Nature-based Climate Solution. 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 22. Bohrer G, **Villa JA**, Missik JEC, Kinsman-Costello LE, Ju Y, Onyango Y, Yazbeck T, Wrighton K, Riley WJ. Greenhouse Gas Fluxes and Long-Term Nutrient Sequestration in a Temperate Lake-Coastal Wetland Are Determined by Long- and Short-Term Hydrological Changes and Vegetation Patch Types. 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 23. **Villa JA**, Fortela DLB, Sharp W, Torres F, Willis R, Hetler S, DeSpain K*, Holmes S, Zappi M. Carbon Dioxide Sequestration Capacity of Louisiana Highways' Right-Of-Way Lands. 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 24. Bordelon R*, **Villa JA**, Ward EJ. Evaluating Patterns in Patch and Leaf-Level Methane Flux from Louisiana Coastal Wetlands. 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 25. Yazbeck T, Bohrer G, Scyphers M, Missik JEC, Onyango Y, Ward EJ, Bordelon R, Taj D, Villa JA, Wrighton K, Zhu Q, Riley WJ Improving wetland model realism: Activating and parametrizing sub-grid level wetland land-unit in the E3SM land model (ELM). 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 26. **Villa JA**, Gil Bohrer, Yang Ju, Lauren E Kinsman-Costello Nicholas Johnson. Increasing Nitrate Loads Reduces Carbon Sequestration, Nitrogen, and Phosphorus Accumulation on a Freshwater, Estuarine Marsh. 12/2022. *American Geophysical Union Fall Meeting* (Chicago, IL).
 27. Miller BA*, **Villa JA**, Ward EJ, From AS, Merino S, Day RH. Effect of Sea-Level Rise Induced Salinity and Inundation Regimes on Mature Bald Cypress (*Taxodium distichum*) Stands of Southeast Louisiana. 12/2022. *2022 Coastal & Estuarine Summit* (New Orleans, LA).
 28. Blanchard M*, Taj D*, **Villa JA**. Physiological changes of *Typha domingensis* and *Panicum hemitomon* exposed to acute saltwater intrusion events. 10/2022. *Undergraduate Research Conference, Advance Student research Experience, UL* (Lafayette, LA).

29. **Villa JA**, Ju Y, Yazbeck T, Bordelon R*, Ferreira D, Taj D*, Merino S, Ward E, Riley W, Wrighton K, Bohrer G. Effects of ecohydrological patches on methane emissions and carbon sequestration in coastal wetlands. 5/2022. *Department of Energy – Office of Biological and Environmental Research, 2022 Environmental System Science PI Meeting* (Virtual).
30. Taj D*, Bordelon R*, **Villa JA**. Measuring the impact of acute saltwater intrusion on methane and CO₂ fluxes from *Typha domingensis* vegetation patches in a freshwater environment. 5/2022. *Joint Aquatic Sciences Meeting* (Grand Rapids – MI).
31. Bordelon R*, **Villa JA**, Ward E, Merino S. Contrasting relationships in methane and CO₂ fluxes through woody vegetation in a cypress swamp. 5/2022. *Joint Aquatic Sciences Meeting* (Grand Rapids – MI).
32. **Villa JA**, Ju Y, Kinsman-Costello, Bohrer G. How elevation and nutrient runoff affect C sequestration and nutrient accumulation on a freshwater, estuarine wetland. 5/2022. *Joint Aquatic Sciences Meeting* (Grand Rapids – MI).
33. Bohrer G, Ju, Y, **Villa JA**, Onyango Y. Identifying wetland vegetation patch types From HLS remote sensing. 5/2022. *Joint Aquatic Sciences Meeting* (Grand Rapids – MI).
34. Sloey T, Smith V, Roberts B, **Villa JA**, Yando E, Nelson J. Forested Wetland Responses to Nutrient-rich Effluent. 5/2022. *Joint Aquatic Sciences Meeting* (Grand Rapids – MI).
35. **Villa JA**, Bohrer G, Kinsman-Costello L, Yazbeck T, Johnson N, Suto A, Kelsey D. Understanding the role of microtopography and nutrient runoff in P accumulation rates of a freshwater estuarine wetland in Lake Erie. 3/2022. *State of Lake Erie* (Cleveland, OH).
36. Bohrer G, Ju Y, Yazbeck T, Missik J, Kujawa H, **Villa JA**, Wrighton K, Riley W. Methane emissions and carbon sequestration in a Lake Erie estuarine wetland. 3/2022. *State of Lake Erie* (Cleveland, OH).
37. Bohrer G, Ju Y, Missik JEC, **Villa JA**, Kubatko E, Wrighton K. Understanding hydrological and ecological controls on methane flux in Lake Erie estuarine mineral-soil marsh. 12/2021. *American Geophysical Union Fall Meeting* (New Orleans, LA).
38. Narrowe AB, Borton M, Liu P, **Villa JA**, McGivern BB, Daly R, Rodriguez-Ramos J, Nikulkova M, Schaffer M, Northen T, Tfaily MM, Miller CS, Hoyt DW, Bohrer G, Morin TH, Wrighton K. A deep, diverse reservoir of methane-cycling microorganisms resists hydrologic perturbation to sustain metabolic activity in freshwater wetland soils. 12/2021. *American Geophysical Union Fall Meeting* (New Orleans, LA).
39. Oliverio A, Narrowe AB, Borton M, Liu P, **Villa JA**, McGivern BB, Daly R, Rodriguez-Ramos J, Nikulkova M, Schaffer M, Northen T, Tfaily MM, Hoyt DW, Bohrer G, Morin TH, Miller CS, Wrighton K. Elucidating the ecological dynamics of microbial systems in freshwater wetlands with an integrative omics approach across time and space. 12/2021. *American Geophysical Union Fall Meeting* (New Orleans, LA).
40. Ponce M*, Gondran A*, Huval T*, Bordelon R*, Taj D*, **Villa JA**. Does discharge of treated municipal wastewater increase methane fluxes? A study case in Broussard, LA. 12/2021, Poster. *American Geophysical Union Fall Meeting* (New Orleans, LA).
41. Stuart-Haëntjens EJ, Bergamaschi BA, Gough CM, Neubauer SC, Knox S, **Villa JA**, Bohrer G, Anderson FE, Woo I, Zhu Z, Nakatsuka K, Nakai G, Matheny AM, Windham-Myers L. How elevation influences carbon dioxide and methane fluxes from tidal fresh and saltwater wetlands. 12/2021, Poster. *American Geophysical Union Fall Meeting* (New Orleans, LA).
42. Bordelon R*, Gomez V*, Taj D*, **Villa JA**. Trees and Knees: Quantifying methane flux from woody vegetation in a Louisiana swamp. 12/2021, Poster. *American Geophysical Union Fall Meeting* (New Orleans, LA).
43. Taj D*, Bordelon R*, **Villa JA**. Measuring the effects of acute saltwater intrusion on methane and CO₂ fluxes from freshwater wetland vegetation: an experimental ecosystem-scale approach. 12/2021, Poster. *American Geophysical Union Fall Meeting* (New Orleans, LA).
44. Gomez V*, Bordelon R*, **Villa JA**. Effects of individual source measurement chambers on stomatal conductance during methane flux observations. 5/2021. Poster. *20th Annual Meeting of the American Ecological Engineering Society: Ecologically Engineering the Future* (Virtual meeting).
45. Taj D*, **Villa JA**. Measuring the impact of acute saltwater intrusion on methane and CO₂ fluxes from freshwater wetland vegetation patches. 5/2021, Poster. *20th Annual Meeting of the American Ecological Engineering Society: Ecologically Engineering the Future* (Virtual meeting).

46. Bordelon R*, Gomez V*, Taj D*, **Villa JA**. Effects of plant senescence on methane and CO₂ flux in southern cattails (*Typha domingensis*). 5/2021. *20th Annual Meeting of the American Ecological Engineering Society: Ecologically Engineering the Future* (Virtual meeting).
47. **Villa JA**, Ju Y, Stephen T*, Rey-Sanchez C, Wrighton KC, Bohrer G. Plant-mediated methane transport in a temperate freshwater estuarine marsh. 3/2021. *13th International Symposium on Biogeochemistry of Wetlands "Wetlands in a Changing Climate"* (Virtual Meeting).
48. Gomez V*, Bordelon R*, **Villa JA**. Does stomatal conductance in southern cattails (*Typha domingensis*) change during methane flux observations? 3/2021, Poster. *13th International Symposium on Biogeochemistry of Wetlands "Wetlands in a Changing Climate"* (Virtual Meeting).
49. Bordelon R*, Gomez V*, Taj D*, **Villa JA**. Effects of plant senescence in methane transport in southern cattails (*Typha domingensis*). 3/2021. *13th International Symposium on Biogeochemistry of Wetlands "Wetlands in a Changing Climate"* (Virtual Meeting).
50. **Villa JA**, Ju Y, Yazbeck T, Waldo S, Wrighton KC, Bohrer G. Methane diffusion and ebullition from ecohydrological patches in a freshwater estuarine marsh: Underscoring the spatial heterogeneity of methane fluxes within wetland ecosystems. 12/2020. *American Geophysical Union Fall Meeting* (Online Everywhere).
51. Rodríguez-Ramos JA, Borton M, Smith G, McGivern BB, Solden LM, Graham EB, **Villa JA**, Nelson WC, Song HS, Purvine S, Nicora C, Daly R, Lipton MS, Hoyt DW, Bohrer G, Stegen J, Wrighton KC. The tale of a microbial community and its infective agents: Microbial and viral interactions fuels carbon and nitrogen cycling in the hyporheic zone of the Columbia River. 12/2020, Poster. *American Geophysical Union Fall Meeting* (Online Everywhere).
52. Morin TH, Riley WJ, Grant RF, Mekonnen ZA, Stefanik KC, Rey-Sanchez C, Mulhare M, **Villa JA**, Wrighton KC, Bohrer G. Wetland water level projected to control 21st century carbon and warming source/sink behavior at a temperate wetland. 12/2020, Poster. *American Geophysical Union Fall Meeting* (Online Everywhere).
53. Ju Y, **Villa JA**, Bohrer G. Quantification of methane emissions from different land-cover patches in a heterogeneous wetland. 12/2020, Poster. *American Geophysical Union Fall Meeting* (Online Everywhere).
54. Bohrer G, **Villa JA**, Ju Y, Stephen T, Rey-Sanchez C, Wrighton KC. Wetland phenology and the consequences to methane emissions at a Lake Erie estuarine mineral-soil marsh. 12/2019. *AGU Fall Meeting* (San Francisco, CA).
55. Ju Y, **Villa JA**, Bohrer G. Distribution of Plant communities in relation to water level fluctuation at an estuarine marsh. 6/2019, Poster. *19th Annual Meeting of the American Ecological Engineering Society* (Asheville, NC).
56. **Villa JA**, Ju Y, Rey-Sanchez C, Morin TH, Bohrer G. Towards wetland creation and restoration in the Lake Erie basin with reduced feedbacks from methane emissions. 6/2019, Poster. *19th Annual Meeting of the American Ecological Engineering Society* (Asheville, NC).
57. **Villa JA**, Smith G, Renteria L, Stegen J, Wrighton KC, Bohrer G. Methane and nitrous oxide porewater concentration and flux at the hyporheic zone of a large river. 5/2019, Poster. *Department of Energy – Office of Biological and Environmental Research, 2019 Environmental System Science PI Meeting* (Potomac, MD).
58. Rodríguez-Ramos J, Borton M, Smith G, Solden L, Daly R, **Villa JA**, Graham E, Purvine SO, Arntzen E, Song HS, Nelson W, Lipton M, Bohrer G, Stegen J, Wrighton KC. More than Meets the Eye: Microbial Communities and their Viral Predators Govern Carbon and Nitrogen Transformations in the Hyporheic Zone. 5/2019, Poster. *Department of Energy – Office of Biological and Environmental Research, 2019 Environmental System Science PI Meeting* (Potomac, MD).
59. Stephen TL, **Villa JA**, Bohrer G. Measuring greenhouse gas fluxes due to ebullition in a freshwater estuarine wetland. 1/2019, Poster. *American Meteorological Society 18th Annual Student Conference* (Phoenix, AZ).
60. **Villa JA**, Stephen T, Rey-Sanchez CA, Bohrer G. Relationships between methane flux and carbon fixation in three cosmopolitan wetland plant genera. 12/2018. Poster. *American Geophysical Union Fall Meeting* (Washington D.C.).

61. Solden LM, **Villa JA**, Graham EB, Purvine SO, Tfaily M, Arntzen E, Nelson WC, Wilkins MJ, Bohrer G, Lipton J, Stegen J, Wrighton KC. Microbial Ammonium cycling is critical to nitrogen transformations in Columbia River Sediments. *Department of Energy – Office of Biological and Environmental Research, 2018 Environmental System Science PI Meeting* (Potomac, MD).
62. **Villa JA**, Daly R, Smith G, Narrowe A, Rey-Sanchez C, Ju Y, Morin T, Kinsman-Costello L, Wrighton KC, Bohrer G. Understanding the links between nutrient cycling, hydrology and nutrient loading in a Lake Erie estuarine wetland. 2018/09. Poster. *Understanding Harmful Algal Blooms: State of The Science* (Toledo, OH).
63. **Villa JA**. Carbon sequestration and methane emissions in a tropical alpine wetland along a water table gradient. 2018/05. *SWS annual meeting* (Denver, CO).
64. **Villa JA**, Quevedo JC*, Moreno FH. Methane emissions in two different hydrogeomorphic tropical wetlands in South America. 2018/05. *SWS annual meeting* (Denver, CO).
65. **Villa JA**. Carbon flows in high-altitude tropical wetland. 11/2017. *Congreso Iberoamericano Humedales Tropicales* (Barranquilla, COL).
66. **Villa JA**. Carbon sequestration in a paramo wetland along water table gradient. 10/2017. *IX Congreso de la Red Latinoamericana de Ciencias Ambientales* (San Luis Potosí, MEX).
67. **Villa JA**, Moreno FH, Quevedo JC*, Osorno AM*, Marulanda JM*. From lowlands to mountain tops: carbon flow and measurements in wetlands of different geomorphic classes for resource management and planning. 08/2016. *5th Ecosummit – Ecological Sustainability* (Montpellier, FR).
68. **Villa JA**, Handler M, Bernal B, Bohrer G. Carbon sequestration in wetlands: Methods to determine accretion rates. 03/2016. *Segundo Congreso Interamericano de Cambio Climático* (Mexico City, MEX).
69. **Villa JA**, Mitsch WJ. Carbon sequestration vs methane emissions in four different wetland plant communities of southwest Florida. 05/2014. *Joint aquatic sciences meeting* (Portland, OR).
70. **Villa JA**, Mitsch WJ. Diurnal and seasonal variations in methane emissions from different wetland plant communities in southwest Florida. 05/2013 *SWS annual meeting* (Duluth, MN).
71. **Villa JA**, Mitsch WJ. Diffuse methane emissions from different wetland plant communities in the big cypress swamp. 09/2012. *4th International Ecosummit* (Columbus, OH).
72. **Villa JA**, Mitsch WJ. Determining the role of different wetland plant communities on the export of dissolved organic carbon in the Florida Everglades - a mesocosm experiment. 06/2012. *9th Intecol International Wetlands Conference* (Orlando, FL).

STUDENT MENTORING

Doctoral students

Earth and Energy Science Ph.D. Program, UL Lafayette: Diana Taj (1/2022-present) || Robert L. Bordelon (8/2021-present) || Mahpara Mashiyat (8/2022-present).

Master students

Environmental Resource Science, UL Lafayette: Aaron Gondran (1/2023-present), Sadia Islam (8/2022-present), Lindsey Harris (8/2022-12/2023) || Blair Miller (8/2020-present) || Diana Taj (8/2020-12/2021) || Robert L. Bordelon (7/2020-8/2021).

Geology, UL Lafayette: Claire Brovold (8/2021 – 5/2023).

Forests and Environmental Conservation Graduate Program, Universidad Nacional de Colombia: Julio C. Quevedo (6/2015-12/2019).

McNair fellows

Karessa de la Paz (1-2022-present) || Victoria Gomez (8/2020-5/2021).

Undergraduate research interns

Environmental Sciences, UL Lafayette: Mia Rinaudo (8/2023-present) || Jude Digilormo (6-7/2023) ||

Madeline Moore (8/2022-present) || Monique Blanchard (8/2022-present) || Jordan Stoll (8-12/2022) || Luke Romero (6-7/2023) || Benjamin Hymel (6-7/2023) || Jillian Mina (1-12/2022) || Ana Huval (1-5/2022) || Mason Marcantel (6-7/2022) || Eriell Jenkins (6-7/2022) || Ahmad Fears (6-7/2022) || Aaron Gondran (6-12/2021) || Théo Huval (6-12/2021) || Kenneth Despain (6-7/2021) || Jacob Deslattes (1-4/2021).

Environmental Engineering, Corporación Universitaria Lasallista: Ana M. Osorno (7/2015-1/2016) || Juliana M. Marulanda (7/2015-6/2016) || Daniela Velázquez (1-12/2017) || Juliana Bermúdez-Hincapié (2-8/2015) || Luisa F. Saldarriaga-Rendón (2-8/2015) || Sharon A. Acosta-Rojas (2/2015-6/2016) || Andrés Botero (2/2016-12/2017).

Ph.D. committee member

Earth and Energy Science Ph.D. Program, UL Lafayette: Naomi Matthew (3/2023-present).

Master's committee member

Environmental Resource Science, UL Lafayette: Holly Heafner (2023) || Eden Maier (2022) || Sidney Renard (2021) || George Bailey (2022) || Habbeb AbdulAzeez (2021).

Geology, UL Lafayette: Ayobami Tolulope Ayodele (2023) || Megan Loop (2023) || Allison Higdon (2023) || Ryan Hood (2021) || Wiley Griffin (2022).

Computer Science, UL Lafayette: Payton LeathemBoe (2022).

Forests and Environmental Conservation Graduate Program, U. Nacional de Colombia: Juliana M. Valencia (2017).

Students in research experience abroad at Ohio State University (guest mentor)

Forests and Environmental Conservation Graduate Program, U. Nacional de Colombia: Julio C. Quevedo (7/2018).

Environmental Engineering, Corporación Universitaria Lasallista: Ana M. Osorno (6-7/2015) || Ana M. Restrepo (6-7/2015) || Sharon A. Acosta (6-7/2016).

Students in research experience abroad at Corporación Universitaria Lasallista (host mentor)

Dept of Civil, Env. and Geo. Engineering, The Ohio State University: Miriam Handler (6-7/2015) || Austin Rechner (2/2017) || Camilo A. Rey-Sánchez (7/2017).

PhD Candidacy Examination Committee

Hydraulic Resources Graduate Program, Universidad Nacional de Colombia: María F. Cárdenas (11/2014).

Environmental Planning & Management of Watersheds Graduate Program, Universidad de Tolima (COL): Javier E. Carvajal (6/2019).

TEACHING EXPERIENCE

U: Undergraduate, G: Graduate

University of Louisiana at Lafayette: Environmental Sciences & MS in Natural Resource Sciences

Wetland Soils (U): Spring 2022, 2021 || Coastal Restoration (G): Fall 2023, 2022, 2021, 2020 || Coastal Sciences (U-G): Fall 2023, 2022, 2021, 2020 || Fate of Pollutants in Soil and Natural Waters (G): Spring 2023, 2022, 2021, 2020 || Soil-Plant Relationships (U-G): Spring 2020 || Environmental Resources Seminar (G): Fall 2021, Spring 2020.

The Ohio State University: Environmental Engineering

Applied Hydrology (Co-Instructor, U-G): Fall 2019, 2018

Corporación Universitaria Lasallista: Environmental Engineering

Hydrology (U): 2014-2017 || Soils (U): Fall 2017, Spring 2016 || Environmental Modeling (U): Fall 2014 ||

Tropical Ecosystems (U): Fall 2016, 2014, Spring 2015 || Environmental Planning (U): 2009 || Ecology and Biodiversity (U): 2009.

Universidad Nacional de Colombia: Forests and Environmental Conservation

Wetlands' Ecohydrology (G): Fall 2015, Spring 2016.

Universidad EAFIT: Process Engineering

Ecology (U): 2009

ACADEMIC SERVICE

School of Geosciences, UL

Representative for the Earth and Energy Sciences Ph.D. Program Coordinator Committee (8/2023-present).

Chair in Search Committee for Tenure-track position in Global Change – UL req: 2074 (10/2022-5/2023).

Committee member for Tenure-track position in Soil Biogeochemistry (1-5/2020).

Environmental Science program, UL

Undergraduate Academic Advisor (8/2021-present).

SYNERGISTIC ACTIVITIES

Editorial appointments

Associate Editor, Journal of Geophysical Research-Biogeosciences 1/2022 -present

Guest expert

Science and Carbon Meeting # 1: Carbon fluxes of existing and converted Louisiana habitats. The Water Institute of the Gulf. 7/2021.

Science project proposals referee

Department of Energy. Environmental System Science Program, National Laboratory project. 5/2023.

Minciencias (COL). Sistema General de Regalias, SGR-031-2022. 11/2022.

National Science Foundation. Division of Environmental Biology, NSF-22-541. 6/2022.

Department of Energy, Environmental System Science Program. Terrestrial-Aquatic Interface Science. 5/2021.

California Sea Grant, 2021 Delta Science Awards. 5/2021.

National Water Resources Research Institutes & US Geological Survey, 2020 Annual In-State Competitive Research Grants Program. 12/2020.

South Central Climate Adaptation Science Center, Funding opportunity FY 2021. 11/2020.

Session convener in Scientific Conferences

Primary convener: Integrating biological components in biogeochemical models: towards improving global circulation model representations of methane emissions, with Stuart-Haëntjens EJ, Morin TH (conveners). 12/2021. American Geophysical Union Fall Meeting (New Orleans, LA).

Co-convener. Greenhouse Gas Dynamics of Coastal and Freshwater Ecosystems, with Missik J, Cotner J, Rose K, del Giorgio P, DelSontro T (conveners). 5/2022. Joint Aquatic Sciences Meeting (Grand Rapids – MI).

Journal referee

New Phytologist || Global Change Biology || Limnology and Oceanography || Nature Communications ||

Science || Nature Geoscience || JGR: Biogeosciences || Ecological Engineering || Plos One || Revista de Biología Tropical || Hydrology and Earth System Sciences || Regional Environmental Change || Science of The Total Environment || Restoration Ecology || Acta Oecologica || Geoderma

Professional affiliations

Society of Wetland Scientist || American Geophysical Union || Red Latinoamericana de Ciencias Ambientales || Global Lake Ecological Observatory Network (GLEON).