

ADRIEL M. SIERRA

A Botanist interest in the ecology and conservation of tropical forest

RESEARCH FIELDS: Biodiversity. Botany. Conservation Biology. Disturbance Ecology. Ecology & Evolution. Microbial Ecology.



CURRENT APPOINTMENT

2019 -



Université Laval PhD. Student

Université Laval

📍 Canada

- [Assessing habitat disturbance impacts on plant demography, genetic structure, and phyllosphere microbiota](#)



EDUCATION

2019 -



PhD candidate, Biology

Université Laval

📍 Québec, Canada

Supervisor: Juan Carlos Villarreal A.

2016

2018



MSc Botany

Instituto Nacional de Pesquisas da Amazônia

📍 Manaus, Brazil

Thesis: Metacommunity dynamics of epiphyllous bryophyte in fragmented forest in the Amazonian forest.

Supervisors: Charles E. Zartman & José J. Toledo

2010

2015



BSc Biology, Minor in Plant Biology

Universidad de Panamá.

📍 Panama, Panama

Thesis: Comunidades de hepáticas epífilas (Marchantiophyta) sobre Piper grande vahl., en el P.N.G.D. Omar Torrijos H., El Copé.

Supervisors: Nayda Flores & Noris Salazar Allen



PRIOR RESEARCH POSITIONS

2018

2019



Research collaborator

Amazon Fertilization Experiment (AFEX). Instituto Nacional de Pesquisas da Amazônia (INPA)

📍 Manaus, Brazil

CONTACT INFO

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adsierra26@gmail.com

🔗 [ORCID](#)

🐙 [Github](#)

🔖 [Google scholar](#)

📄 [CNPq CV Lattes](#)

SKILLS

Field work in terrestrial habitats.
Botany & Entomology.

Experimental ecology and long term monitoring

Molecular and chemical laboratory techniques

Statistics in [R](#)

Bioinformatics - Unix-like

Herbarium curator techniques

LANGUAGE

Spanish Native

English Fluent

Portuguese Fluent

French Intermediate

- 2017
|
2018 ● **Research collaborator**
Long-Term Plot Monitoring Project in central Amazonia (PELD-MAUÁ). Instituto Nacional de Pesquisas da Amazônia (INPA)
📍 Manaus, Brazil
- 2018 ● **ELAP research Fellow**
Université Laval. L'Institut de biologie intégrative et des systèmes (IBIS).
📍 Québec, Canada
- 2016
|
2017 ● **Graduate research fellow**
Biological Dynamics of Forest Fragments Project (BDFFP)
📍 Manaus, Brazil
- 2015
|
2016 ● **Research intern**
Smithsonian Tropical Research Institute (STRI) 📍 Panama



PEER REVIEWED PUBLICATIONS

- In prep ● **Regional-level shift in epiphyllous bryophytes associated diazotroph community structure and diversity in an amazonian fragmented landscape**

Adriel M. Sierra, Dennis O. Escolastico, Charles E. Zartman & Juan Carlos Villarreal A.
- In prep ● **Flood pulse disturbance shapes vertical and horizontal species richness patterns of epiphytic bryophytes in an Amazonian black-water forest**

Charles E. Zartman, Adriano C. Quaresma, Maihyra M. Pombo, Gabriel M. Marcusso & Adriel M. Sierra
- In revision ● **Cyanobacteria detectability using the rbcL-X amplicon shows a reduced core microbiome in the coralloid roots of tropical gymnosperm Symbiosis**

Sandrine Toupin, Adriel M. Sierra, Marta Alonso-García, Maycol Madrid, Noris Salazar Allen & Juan Carlos Villarreal A.
- In revision ● **The consequences of mating system and dispersal potential on the genetic structure of leaf-inhabiting bryophyte metapopulations in a fragmented Amazonian landscape**
Molecular Ecology [preprint](#)
Adriel M. Sierra, Marta Alonso-Garcia, Charles E. Zartman & Juan Carlos Villarreal A.
- accepted ● **Catalogue of liverworts (Marchantiophyta) and hornworts (Anthocerotophyta) from Central America and Cocos Island**
Smithsonian Institution Scholarly Press
Gregorio Dauphin, Lars Söderström, Anders Hagborg, Noris Salazar Allen, Adriel M. Sierra, Tamás Pócs, José Gudiño L., Mervin E. Pérez, Juan Carlos Villarreal, Yarency Rodríguez, Matt von Konrat, Alan Whittemore

- 2023 ● **Phylogenomic time tree of bryophytes resolves 500 million years of diversification**
[American Journal of Botany](#)
 Julia Bechteler, Gabriel Peñaloza-Bojacá, David Bell, Gordon Burleigh, Stuart F. McDaniel, Christine Davis, Emily Sessa, Alexander Bippus, Christine Cargill, Salut Chantanaorrapint, Isabel Draper, Gaik Ee Lee, Lorena Endara, Laura L. Forrest, Ricardo Garilleti, Sean Graham, Sanna Huttunen, Javier Jauregui Lazo, Francisco Lara, Juan Larraín, Lily Lewis, David Long, Dietmar Quandt, Karen S. Renzaglia, Alfons Schäfer-Verwimp, **Adriel M. Sierra**, Matt von Konrat, Charles Zartman, Bernard Goffinet, & Juan Carlos Villarreal A.
- 2023 ● **A taxonomic review of the Amazonian rheophyte *Schusterolejeunea* (Spruce) Grolle (Lejeuneaceae: Cololejeuneinae), with two new combinations**
[Cryptogamie, Bryologie 44\(4\):107-122](#)
Adriel M. Sierra & Charles E. Zartman
- 2022 ● **Historical biogeography of the austral hornwort genus *Phaeomegaceros* (Dendrocerotaceae, Anthocerotophyta)**
[Bryophyte Diversity and Evolution 45 \(1\): 44-66](#)
 Gabriel Felipe Peñaloza-Bojacá, **Adriel M. Sierra**, Hannes Becher, Karen S. Renzaglia, Juan Carlos Villarreal A.
- 2022 ● **Bryophyte diversity and new species occurrences from Carauari in southwestern Amazonas, Brazil**
[Pesquisas, Botânica 76: 263-271](#)
 Marta Regina Pereira, Francisca Andriele Nascimento da Silva, Jair Max Fortunato Maia, Ana Sofia Sousa de Holanda & **Adriel M. Sierra**
- 2021 ● **A comparative study of temporal variation of two epiphytic bryophytes in a central Amazonian white-sand forest, Brazil**
[Hoehnea 48: e1352020](#)
 Marta R. Pereira, **Adriel M. Sierra**, Jair Max Furtunato Maia & Ana Sofia Sousa de Holanda
- 2021 ● **Unveiled diversity: Amazonian Campinaranas harbor twice the number of bryophyte species recorded in the last century**
[Acta Botanica Brasilica 35: 1-14](#)
 Gabriela Ramos Cerqueira, **Adriel M. Sierra**, Anna Luiza Ilkiu-Borges, Sylvia Mota-de-Oliveira & Charles E. Zartman
- 2021 ● **Two new species of *Ceratolejeunea* (Lejeuneaceae) and five noteworthy records for Brazil**
[Bryophyte Diversity and Evolution 44:12-21](#)
Adriel M. Sierra, Cid José Passos Bastos & Charles E. Zartman

- 2020 ● **Synopsis of the genus *Pycnolejeunea* (Spruce) Schiffn. (Lejeuneaceae, Marchantiophyta) in Brazil**
[Hoehnea 47: e1132019](#)
 Cid José Passos Bastos, Adriele Lima Gentil, **Adriel M. Sierra** & Charles E. Zartman
- 2019 ● **Are extinction debts reflected in temporal changes of life history trait profiles? A fifteen-year reappraisal of bryophyte metacommunities in a fragmented landscape**
[Biological Conservation 238: 108-218](#)
Adriel M. Sierra, José J. Toledo, Henrique E. Nascimento, Marta R. Pereira & Charles E. Zartman
- 2019 ● ***Drepanolejeunea robinsonii* (Lejeuneaceae: Drepanolejeuneinae), a new epiphyllous species from the Amazon forest**
[The Bryologist 122: 292–296](#)
 Charles E. Zartman, **Adriel M. Sierra** & Rui-Liang Zhu.
- 2019 ● **Advances in Calymperaceae (Dicranidae, Bryophyta) infra-familial phylogenetic relationships, geographical origin and divergence times**
[The Bryologist 122: 183–196](#)
 Marta R. Pereira, Paulo E. A. S. Câmara, Bruno S. Amorim, Stuart McDaniel, Adam Payton, Sarah B. Carey, **Adriel M. Sierra** & Charles E. Zartman
- 2019 ● **Contribution to the Bryophyte flora of Brazil: new country and state records from Amazonia**
[Rodriguésia 70: 1–9](#)
Adriel M. Sierra, Marta R. Pereira & Charles E. Zartman
- 2019 ● **Reproductive traits as predictors of assembly chronosequence patterns in epiphyllous bryophyte metacommunities**
[Journal of Ecology 107\(2\): 875-886](#)
Adriel M. Sierra, José Julio Toledo, Noris Salazar Allen & Charles E. Zartman
- 2018 ● **Divergence time analyses suggest a Miocene origin of the narrow Amazonian endemic rheophytic *Ceratolejeunea temnantha* (Spruce) Reiner-Drehwald (Porellales, Lejeuneaceae)**
[Bryophyte Diversity and Evolution 40: 55–67](#)
Adriel M. Sierra, Julia Bechteler, Domingos Cardoso, Charles E. Zartman & Juan Carlos Villarreal

**Shortlisted for the Harper Prize
2019**

- 2018 ● **Bryophytes of Jaú National Park (Amazonas, Brazil): Estimating detectability and species richness in a lowland amazonian megareserve**
[The Bryologist 121: 571–588](#)
 Adriel M. Sierra, Alain Vanderpoorten, Robbert S. Gradstein, Marta R. Pereira, Cid José Passos Bastos & Charles E. Zartman
- 2018 ● **From the Guiana Highlands to the Brazilian Atlantic Rain Forest: four new species of Selaginella (Selaginellaceae Lycopodiophyta: S. agioneuma, S. magnaforensis, S. ventricosa, and S. zartmanii)**
[PeerJ 6:e4708](#)
 Iván A. Valdespino, Christian A. López, Adriel M. Sierra & Jorge Ceballos
- 2016 ● **Three new species of Cheilolejeunea (Spruce) Steph. (Marchantiophyta, Lejeuneaceae) from northern Brazil**
[Phytotaxa 277 \(1\): 036-046](#)
 Cid José Passos Bastos, Adriel M. Sierra & Charles E. Zartman
- 2016 ● **Notes on the genus Cololejeunea (Lejeuneaceae) in Panama. C. cingens (New Record) and C. tamarii**
[Polish Botanical Journal 61\(2\): 231-235](#)
 Adriel M Sierra & Gregorio Dauphin
- 2015 ● **Adiciones de especies de hepáticas (Marchantiophyta) para la flora de Panamá II**
[Brenesia 83-84: 16-21](#)
 Gregorio Dauphin, Noris Salazar Allen, José A. Gudiño L., Adriel Sierra & Deisi Reyes
- 2014 ● **Leaf traits and herbivory levels in a tropical gymnosperm, Zamia stevensonii (Zamiaceae)**
[American Journal of Botany 101\(3\):1-11](#)
 Alberto Prado, Adriel Sierra, Donald Windsor, & Jacqueline C. Bede



RESEARCH GRANTS

- 2019 | 2021 ● **NSERC CREATE in Biodiversity, Ecosystem Services and Sustainability (BESS). USD\$28 000.00**
 Phyllosphere microbiome 📍 Québec, Canada
- 2018 ● **Bequests Fund for research grant. USD\$1 100.00**
 Population genomics of epiphyllous bryophyte 📍 British Bryological Society, UK
- 2018 ● **Emerging Leaders in the Americas Program. USD\$8 000.00**
 Metapopulation genomics of epiphyllous bryophyte in fragmented forest 📍 Université Laval, Canada

2016
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2017

● **Thomas Lovejoy Research Support Program, Biological Dynamics of Forest Fragments Project. USD\$4 000.00**

Forest fragmentation effects on metacommunity dynamics of epiphyllous bryophyte

📍 Manaus, Brazil



SCHOLARSHIPS

2019
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2022

● **Faculté des sciences et de génie, Université Laval. USD\$28 000.00**

PhD scholarship

📍 Québec, Canada

2020

● **Bourse de formation à la recherche (Mitacs). USD\$4 800.00**

Évaluation des effets de Sauvetage Démographique, Génétique et Microbien des Gymnospermes Menacées

📍 Québec, Canada

2018

● **Emerging Leaders in the Americas Program. USD\$4 700.00**

Student academic exchange.

📍 Ottawa, Canada

2016
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2018

● **Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) – Brasil. USD\$12 000.00**

Master scholarship

📍 Brazil

2015

● **SENACYT & Smithsonian Tropical Research Institute (STRI). USD\$4 000.00**

Research Experience for Undergraduates (REU) program

📍 Panama

2015

● **Natural History Museum, UK & NERC Science of the Environment.**

Taxonomic principles and tools in botanic research. Full course scholarship plus daily subsistence of USD\$150.00

📍 United Kingdom

2013

● **Eagle Hill Institute, Maine USA.**

Full Scholarship to participate in four courses in the Eagle Hill Institute.

📍 Maine, United States of America

2012

● **University of Wisconsin-Green Bay & Smithsonian Tropical Research Institute (STRI).**

Full Scholarship to participate in the Tropical Ecology course

📍 Panama



AWARDS

2019-
2023

● **Faculté des sciences et de génie, Université Laval.**

Doctoral Accomplishment Scholarship

📍 Québec, Canada

USD\$6000.00

2015

● **Instituto de Ecología y Biodiversidad de Chile-Magallanes. International Association of Bryologist Conference.**




Travel Award

US\$500.00

- 2015 • **Corredor Biológico Mesoamericano del Atlántico Panameño (CBMAP II).**
Travel Award
US\$1 350.00
- 2013 • **Universidad de Panamá. Vicerectoría of Student Affairs (VAE).**
Travel Award
US\$667.40
- 2013 • **Corredor Biológico Mesoamericano del Atlántico Panameño (CBMAP II).**
Travel Award
US\$600.00





TEACHING EXPERIENCE

- 2018 • **Substitute Professor**
Universidade Estadual de Amazonas (UEA)  São Gabriel da Cachoeira, Brazil
Plant Physiology for students of Bachelor degree in Biological Science
- 2016 • **Course instructor**
Instituto Nacional de Pesquisa Amazônica (INPA)  Manaus, Brazil
Introduction to bryophyte identification (General Characteristics, Systematic, Morphology, reproduction and geographic occurrence)
- 2014 • **Guest lecture and laboratory practice**
Universidad de Panamá  Panama
Systematics of seedless plants (BIO 314 Botánica Sistemática I)



CONSULTANT WORK

- 2012 | 2015 • **Flora diversity baseline of the National Parks in Panama**
Corredor Biológico Mesoamericano del Atlántico Panameño (CBMAP II). National System of Monitoring and Information of the Biological Diversity (SNMIDB).  Panama, Panama
- 2014 • **Plant diversity in remnants forest patches**
Corredor Biológico Mesoamericano del Atlántico Panameño (CBMAP II)  Capira, Panama



TECHNICAL ASSISTANCE

- 2014 • **Museum collection curator assistant**
Natural History Museum of Panama.  Panama

2012
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2013

- **Geo-referencing environmental investments**
Corredor Biológico Mesoamericano del Atlántico Panameño (CBMAPII)

📍 Panama

2011
|
2013

- **Herbarium assistant**
Herbarium of Panama (PMA). University of Panama.

📍 Panama

TERRESTRIAL FIELD EXPERIENCE

2011 -

- **Botanical and Ecological Survey**
Bryophytes (Liverwort, Mosses and hornworts), Cycads (Zamia), Angiosperm

📍 Panama

2011
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2015

- **Entomological survey**
General insect collection

📍 Panama

2016
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2019

- **Botanical and Ecological Survey**
Bryophytes (Liverwort, Mosses and hornworts), Angiosperm (Humiriaceae, Arecaceae)

📍 Brazil (Amazon forest & Guyana highlands)

2015

- **Bryophyte survey in Patagonia**

📍 Chile (Navarino Island)

2013

- **Bryophyte survey in temperate forest**

📍 United States, Maine

CONFERENCE PRESENTATIONS

2023

- **Génétique de l'hôte et microbiote diazotrophe associé des bryophytes foliaires dans un paysage amazonien fragmenté expérimentalement.**
16e Colloque du CEF. Québec, Canada. [Poster](#)

2022

- **Impactos da fragmentação na Floresta Amazônica: sobre a biodiversidade de Briófitas epífilas.**
1o Encontro de Briólogos Online e 4 Simpósio de Briófitas do Brasil. [Oral presentation](#)

2021

- **Forest fragmentation impacts on biodiversity of epiphyllous bryophytes in the Amazon.**
Séminaire de mi-parcours. Université Laval.

2021

- **Changes in population size and genetic structure of epiphyllous bryophytes in Amazonian Forest fragments.**
BESS-McGill symposium (Oral presentation)

2021

- **Changements dans la taille de la population et la structure génétique des bryophytes épiphyllous dans les fragments de forêt amazonienne.**
11e édition 2.0 du Colloque du Département de Biologie, Université Laval (Oral presentation)

- 2021 • **The plight of plants in light of deforestation in the Amazon: insights from epiphyllous metacommunity dynamics.**
Bryophytes, lichens, and northern ecosystems in a changing world
BL2021 (Oral presentation)
- 2019 • **Microbiome role on the species assembly of diverse epiphyllous metacommunities.**
BESS-McGill 2019 symposium (Oral presentation)
- 2019 • **Briófitas del bosque amazónico**
Universidad de Panamá. Panamá, Panamá. (Invited speaker)
- 2019 • **Briófitas no margem da floresta Amazônica**
Universidade Federal da Bahia (UFBA). Salvador, Brazil. (Invited speaker)
- 2015 • **Sucesión ecológica en hábitats efímeros: Trayectorias divergentes en comunidades de briofitas epífilas sugieren que no hay una dinámica sucesional.**
XXVII Congreso Científico Nacional, Universidad de Panamá. (Oral presentation)
- 2015 • **Epiphyllous liverworts on the understory shrub, *Piper grande* Vahl., in the National Park G. D. Omar Torrijos H., El Copé (Panamá). Advance report.**
International Association of Bryologist (IAB), Puerto Williams, Chile. (Oral presentation)
- 2013 • **Diversidad Florística en las turberas de Schoodic Point, Acadia National Park. Maine USA.**
XXVI Congreso Científico Nacional, Universidad de Panamá. (Poster)



SCIENTIFIC BLOG POSTS

- 2020 • **A question of a century in ecology leading to applied forest restoration and ecosystem services**
[STRI's Tropical Biology Field Course Blog](#)
- 2020 • **Illustrating tropical forest cryptic organisms**
[STRI's Tropical Biology Field Course Blog](#)
- 2020 • **Bats economic services**
[STRI's Tropical Biology Field Course Blog](#)
- 2020 • **Night sky over Coibita**
[STRI's Tropical Biology Field Course Blog](#)



ACADEMIC AND SOCIAL INVOLVEMENT

- 2021 - • **Student Committee**
[L'Institut de biologie intégrative et des systèmes \(IBIS\), Université Laval.](#) Co-president since 2023
📍 Québec, Canada
- 2023 - • **Scientific outreach of Latin American Bryophytes**
[Briófitas Latinoamérica](#)

PROFESSIONAL SOCIETIES

- British Ecological Society
- American Genetic Association
- International Association of Bryologists
- The Cycad Society
- American Bryological and Lichenological Society

2021

|

2022



**Academic and social integration program at the University
Laval**

[Programme de jumelage, Université Laval](#)

📍 Québec, Canada

2018

|

2019



Botanical Illustration Group

Instituto Nacional de Pesquisa Amazônica (INPA) herbarium

📍 Manaus, Brazil

2016

|

2019



Scientific outreach activities

Instituto Nacional de Pesquisa Amazônica (INPA) & Universidade
Estadual de Amazonas (UEA)

📍 Manaus, Brazil