

# Julie C. ALEMAN

## *Research Scientist*

Département de Géographie - Université de Montréal  
520 Chemin de la Côte-Sainte-Catherine - Montréal QC H2V 2B8  
✉ : [julie.aleman@gmail.com](mailto:julie.aleman@gmail.com) - Phone: 514-688-1578 - Website: [www.juliealeman.com](http://www.juliealeman.com)

## RESEARCH INTERESTS

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Tropical ecology (savanna and forest distribution); fire and disturbance ecology; paleoecology and historical ecology; biogeography; climate and land-use changes

## PROFESSIONAL APPOINTMENTS

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- 2017-present Visiting Research Scientist – Département de Géographie, Université de Montréal (Canada).
- 2014-2017 Post-doctoral Research Associate – Ecology and Evolutionary Biology, Yale University (New Haven, USA).
- 2014 Visiting Scholar – Center for Forest Research at Université du Québec à Montréal (Montreal, Canada).
- 2012-2013 Lecturer and Research Assistant - Ecole Pratique des Hautes Etudes, Department of Life Sciences and Earth (Montpellier, France).

## EDUCATION

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- 2009-2013 **Ph.D. in Ecology and Evolution**- University of Montpellier (France)  
*Dissertation: Vegetation structure in Central Africa: impacts of anthropogenic and natural forcings.*
- 2007-2009 **M.Sc. in Agronomy and Environmental Sciences**- International Centre for Higher Education in Agricultural Sciences, Montpellier (France).  
*Dissertation: Toward a better understanding of farmers' seed exchanges and local production practices on crop diversity: the example of Chenopodium quinoa in Chilean Mapuche communities.*
- 2007 Erasmus exchange – Wageningen University (the Netherlands).
- 2002-2006 **B.Sc. in Agronomy** - International Centre for Higher Education in Agricultural Sciences, Montpellier (France).  
Included an intensive two-year university foundation course to prepare for the entrance examinations to the French 'Grandes Ecoles'.

## PUBLICATIONS

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### *ADVANCED STAGE:*

- Aleman J.C.** and Fayolle A. *In prep.* Vegetation changes in Central Africa: toward a long-term and integrated management framework for both forest and savanna. Pages xx-xx in Sustainability Science in Africa (Springer). Edt. Alexandros Gasparatos.

- Aleman J.C.**, Jarzyna M.A., and Staver A.C. Forest extent and deforestation in tropical Africa since 1900. **In revision after review** (*Nature Ecology & Evolution*)
- Aleman J.C.** and Staver A.C. Spatial interactions influence the global distribution of savanna and forest. **In revision after review** (*Global Ecology and Biogeography*)
- Staver A.C., Pellegrini A.F.A, Bond W., Zambatis N., Govender N., **Aleman J.C.**, Case M., Botha J. Patterns of 23-year grass biomass increase point to CO<sub>2</sub> fertilization in tropical savanna. **Under review** (*Ecology*)
- Wonkam C., Favier C., Bremond L., **Aleman J.C.**, Brossier B., Oslisly R., Canal S., Yongo O., Bentaleb I., Sonké B. and Ledru M-P. Evidences of drought phases in the Guinean periferest savanna since the African Humid Period. **Under review** (*Comptes Rendus de l'Académie des Sciences*).

**PEER-REVIEWED PUBLICATIONS (\* EQUAL CONTRIBUTION):**

- Hawthorne D.\*, Courtney-Mustaphi C.\*, **Aleman J.C.\***, Blarquez O., Colombaroli D., Daniau A.L., Marlon J.R., Power M., Vanni re B., Hanj Y., Hantson S., Kehrwald N., Magi B., Yue X., Carcaillet C., Marchant R., Ayodele O., Githumbi E., Muriuki R. Modern Global Charcoal Database (mGCD): a tool for exploring proxy-fire linkages and spatial patterns of biomass burning. 2017. **Invited** paper in the special Paleofire issue of *Quaternary International*.
- Aleman J.C.**, Blarquez O., Gourlet-Fleury S., Bremond L. and Favier C. Tree cover in Central Africa: determinants and sensitivity under contrasted scenarios of global change. 2017. *Scientific Reports* 7, 41393; doi: 10.1038/srep41393.
- Aleman J.C.**, Blarquez O., Staver A.C. Land-use change outweighs projected effects of changing precipitation on tree cover and habitat loss in sub-Saharan Africa. 2016. *Global Change Biology*, 22 (9): 3013–3025.
- Blarquez O. and **Aleman J.C.** Tree biomass reconstruction shows no lag in post-glacial afforestation of eastern Canada. 2016. *Canadian Journal of Forest Research*, 46(4): 485-498.
- Aleman J.C.**, Canal-Subitani S., Favier C. and Bremond L. Influence of the local environment on lacustrine sedimentary phytolith records. 2014. *Palaeogeography, Palaeoclimatology, Palaeoecology*. 414: 273-283.
- Aleman J.C.**, Blarquez O., Bentaleb I., Bont  P., Brossier B., Carcaillet C., Gond V., Gourlet-Fleury S., Lef vre I., Oslisly R., Power M. J., Bremond L. and Favier C. Tracking land-cover changes with sedimentary charcoal in the Afrotropics. 2013. *The Holocene* 23: 1853-1862.
- Blarquez O., Girardin M. P., Leys B., Ali A. A., **Aleman J.C.**, Bergeron Y. and Carcaillet C. Paleofire reconstruction based on an ensemble-member strategy applied to sedimentary charcoal. 2013. *Geophysical Research Letters* 40: 2667 – 2672.
- Aleman J.C.**, Saint-Jean A., Leys B., Carcaillet C., Favier C., and Bremond L. A method to estimate phytolith influx in lakes sediment. 2013. *Quaternary Research* 80: 341–347.
- Aleman J.**, Leys B., Apema R., Bentaleb I., Dubois M.A., Lamba B., Lebamba J., Martin C., Ngomanda A., Truc L., Yangakola J-M., Favier C. & Bremond L. Reconstructing past savanna tree cover from pollen, phytoliths and stable carbon isotopes. 2012. *Journal of Vegetation Science* 23: 187–197

Favier C., **Aleman J.**, Bremond L., Dubois M.A., Freycon V., Yangakola J.M. Abrupt shifts in African savanna tree cover along a climatic gradient. 2012. *Global Ecology and Biogeography* 21: 787–797.

**Other publications:**

Kehrwald N., **Aleman J.C.**, Coughlan M., Courtney-Mustaphi C., Githumbi E., Magi B.I., Marlon J. R., Power M.J. One thousand years of fires: Integrating proxy and model data. 2016. *Frontiers in Biogeography*, 8 (1).

Gourlet-Fleury S., and all the CoForChange collaborators (including **Aleman J.C.**) 2014. Improve the characterization of tropical forests to improve management. Policy brief – conclusion of the CoForChange program.

Thomet M., **Aleman J.**, Bazile D., Pham J-L. 2010. Impactos de la redefinición del concepto de Trafkintü sobre la diversidad de variedades de quinoa cultivadas por agricultores mapuches en cuatro comunas de la región de la Araucanía del sur de Chile. *Anales de la Sociedad Chilena de Ciencias Geográficas*: 244-249.

**Aleman J.**, Thomet M., Bazile D., Pham J-L. 2010. Central role of nodal farmers in seed exchanges for biodiversity dynamics : example of « Curadoras » for the Quinoa conservation in Mapuche communities in South Chile. *Innovation and Sustainable Development in Agriculture and Food*.

Bazile D., Thomet M., **Aleman J.**, Pham J-L. 2010. Impactos de las redes sociales sobre los flujos de semillas. Aplicación al caso de la biodiversidad de quinoa de las comunidades Mapuches (región de la Araucanía, sur de Chile). *Memoria Resúmenes del III Congreso Mundial de la Quinoa, 16 al 19 de Marzo de 2010*.

**Public communications:**

Why the future of Africa’s forest and savannas is under threat. The Conversation: Africa, highlighted in CNBC Africa.

**FELLOWSHIPS AND GRANTS**

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2017	<i>National Science Foundation</i> , Population and community Ecology; 2018-2022 (role: senior personnel). Invited to submit a full proposal. Collaborative Research: Pyrogenic bamboo thickets as a model for studies of past, present, and future environmental change in the American tropics. <i>Pending</i>
2017	PAGES workshop organization grant – GPWG2 workshop in Nairobi, Kenya (Apr. 2018) – PI, \$10,000
2017	PAGES Travel Grant, awarded for participating to the workshop “EcoRe3”, Finse (27-31 March 2017) - \$1200
2016	PAGES Travel Grant, awarded for participating to the workshop “Fire history baselines by biome”, Université de Bordeaux (25-29 Sept 2016) - 700 €
2015-2016	WWF Tanzania – Reading the Historical Record of the Mara river Using Sediment Cores from the Mara Wetland (co-PI) - \$65,000
2015-2016	Nell I. Mondy fellowship, Graduate Women in Science (GWIS - Sigma Delta Epsilon) – Savanna in the South Congo: human or climate legacy? (PI) - \$7680
2012-2013	1-year teaching and research assistant fellowship, Ecole Pratique des Hautes Etudes - 15,000 €

- 2010-2011 French Agricultural Research Centre for International Development (CIRAD) grant to support graduate projects - 5000 €
- 2009-2012 3-year Doctoral fellowship (Centre National de la Recherche Scientifique / CIRAD) - 60,000 €
- 2009 6-month Graduate Research Grant (Institut de Recherche pour le Développement) - 4980 €
- 2007 International Centre for Higher Education in Agricultural Sciences grant to support Erasmus graduate program exchange - 1800 €

## **TEACHING ACTIVITIES**

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### **Invited lecture (B.A.)**

- 2016 and 2017 Vegetation changes in sub-Saharan Africa since the Last Glacial Maximum: impacts of Human societies and abrupt climate changes. (Université de Montréal – Département d'Anthropologie)
- November 2015 Impacts of Human societies and climatic changes on the ecosystems of Sub-Saharan Africa (Université de Montréal – Département de Géographie)
- March 2015 Climate and vegetation changes in Africa since the Last Glacial Maximum (Université de Montréal – Département de Géographie)

### **Teaching assistant – Department of Biology and Ecology, University of Montpellier (B.Sc.)**

- 2012 Introduction to Botany (30 h) and Plant Evolution (20 h)
- 2009-2012 Ecology and Biology of the Angiosperm plants (85 h)
- 2009-2011 Ecology and Biology of the Algae and Fungi (70 h)

### **Master students mentoring**

- 2011-2012 *Roxane Sansilvestri* (M.Sc.2, Université de Paris-Orsay): Holocene reconstruction of vegetation cover using lacustrine sedimentary phytoliths records.
- 2011-2012 *Jessica Sutra* (M.Sc.1, Ecole Pratique des Hautes Etudes - Paris): Reconstruction of fire history during the Holocene using charcoal records from lacustrine sediments.
- 2010-2011 *Audrey Saint-Jean* (M.Sc.1, Université de Poitiers): Testing silica microspheres as an exogenous marker for phytolith concentration computation.

### **Informal PhD students mentoring**

- 2016-present *Andy Hennebelle* (PhD student, Département de Géographie, Université de Montréal): Pollen and charcoal particles calibration.

### **Undergraduate students mentoring**

- 2016 *Amélie Chaput* (Geography, Université de Montréal): An index for prioritizing conservation areas in savannas of sub-Saharan Africa (QGIS, R)
- 2015-2016 *Dimitri Diagne* (EEB, Yale University): Reconstructing the fire history in the Mara river basin using charcoal particles.

## SKILLS

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### Field experience

Field interviews of farmers in Mapuche communities (Chile) and in Aveyron (France).

Organization of fieldworks:

(1) Lake and river sediments sampling (Russian, Livingstone and Kajak-Brinkhurst corers) in Central African Republic, Republic of Congo and Tanzania.

(2) Botanical surveys in Central African Republic, Cameroon and Republic of Congo.

### Analytical skills

Statistical analyses and modeling (multinomial logistic regressions, GAM, GLM, Random Forest...) in R, statistics in Matlab.

Good level training in geographical information system (Q-GIS, ArcGIS, ENVI), use of historical photographs and satellite images.

### Laboratory skills

Sedimentology:  $^{210}\text{Pb}$ ,  $^{137}\text{Cs}$  and  $^{14}\text{C}$  age-depth models.

High level in phytoliths extraction and identification.

Development of new charcoal proxies to reconstruct past fire history.

Analyses and interpretation of  $\delta^{13}\text{C}$ , phytoliths, pollen and charcoal proxies to reconstruct past vegetation structure and fire history.

### Language skills

English: Fluent

French: Mother tongue

Spanish: Good knowledge

## COMMUNICATIONS

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### Oral communications (conferences, workshops and seminars – invited\*)

**Aleman J.C.\*** Dynamique des zones de contact forêt-savane dans les Tropiques : une perspective à long-terme. Congrès de l'Association Francophone pour le Savoir, Montréal, Canada. May 2017.

**Aleman J.C.\*** and Staver A.C. Spatial interactions influence the global distribution of savanna and forest. Annual Conference of the European Society for Tropical Ecology, Brussels, Belgium. February 2017.

**Aleman J.C.**, Henga K., Favier C. and Bremond L. Quantitative reconstructions of vegetation cover from lake sediments: the power of multi-proxy analyses. 10<sup>th</sup> International Meeting on Phytolith Research, Aix-en-Provence, France. September 2016.

**Aleman J.C.**, Jarzyna M.A. and Staver A.C. Redefining the historical forest extent in sub-Saharan Africa: implications for grass-dominated biomes conservation. Association for Tropical Biology and Conservation annual meeting, Montpellier, France. June 2016.

**Aleman J.C.\*** Sustainable management of the Savanna Biome: fire, land-use and climate change. Department of Geosciences, University of Missouri at Kansas City. March 2016.

- Aleman J.C.\*** Paleoenvironmental reconstructions in Central Africa and human impacts on past fire regimes. ACACIA Workshop: Mapping Human Subsistence in West Africa (1000 BC-AD 1500). *Les Rasses, Switzerland*. Nov. 2015.
- Aleman J.C.\*** Charcoal data for paleofire reconstruction. “Paleofire: Data-Model Comparisons for the Past Millennium”. *Harvard Forest, Massachusetts, USA*. September, 2015
- Aleman J.C.** and Staver A.C. Spatial interactions influence the global distribution of savanna and forest. Ecological Society of America annual meeting, *Baltimore, Maryland, USA*. Aug. 2015.
- Aleman J.C.** Using several charcoal proxies to reconstruct fire history in tropical environment. AAG annual meeting, *Tampa, USA*. April 2014.
- Aleman J.C.\*** Recording fires in the Tropics using sedimentary charcoal. CoForChange Annual meeting, *Montpellier, France*. Nov. 2012.
- Aleman J.C.\*** and Gond V. The temporal response of Leaf Area of Central African Savannas: roles of precipitation pattern and fire frequency. CIRAD Department seminar, *Montpellier, France*. May 2011.
- Aleman J.**, Thomet M., Bazile D., Pham J.L. Central role of nodal farmers in seed exchanges for biodiversity dynamics: Example of “curadoras” for the quinoa conservation in Mapuche communities (South Chile). ISDA 2010, *Montpellier, France*. June 2010.
- Aleman J.**, Thomet M., Bazile D., Pham J.L. Impacto de proyectos de fomento del cultivo de quinua (*Chenopodium quinoa* Willd.) sobre la conservacion de las variedades locales en comunidades mapuches de la region de La Araucania (Chile). Simposio de Recursos Geneticos para America Latina y el Caribe, *Temuco, Chile*. October 2009.
- Aleman J.**, Thomet M., Bazile D., Pham J.L. Dinamica de los flujos de semillas en la conservacion de las variedades locales de quinua (*Chenopodium quinoa* willd) en comunidades Mapuche de la region de la Araucania (Chile). Simposio de Recursos Geneticos para America Latina y el Caribe, *Temuco, Chile*. October 2009.

### Poster communications

- Aleman J.C.**, Bremond L., Favier C., Bentaleb I., Blarquez O., Brossier B., Oslisly R., Gourlet-Fleury S., Carcaillet C. How charcoal morphology records fuel type in tropical area? Climate change, deforestation & the future of African rainforests, *Oxford, UK*. January 2012.
- Aleman J.**, Favier C., Bremond L., Gond V. Modelisation of Central African savannas’ repartition. Association for Tropical Biology and Conservation annual meeting, *Arusha, Tanzania*. June 2011.
- Aleman J.**, Favier C., Bremond L., Gond V. Spatial repartition of Central African savannas. Annual Conference of the European Society for Tropical Ecology, *Frankfurt, Germany*. February 2011.

### Press

August 2015, TV interview by the first news channel – Republic of Congo.

### PROFESSIONAL AND ACADEMIC SERVICE

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#### Referee:

**Journal** - Ecology; Ecography; Journal of Human Evolution (2); Journal of Biogeography; Biological Conservations; African Journal of Ecology; PloS ONE (2); Scientific Reports; Journal

of Vegetation Science; Palaeogeography, Palaeoclimatology, Palaeoecology (2); Journal of Paleolimnology; Land; The Holocene, International Journal of Applied Earth Observation and Geoinformation; Ecology and Society.

**Funding** - NSF Faculty Early Career Development Program (2016), NSF Collaborative Research Program (2016), GWIS Fellowship (2017).

**Memberships and affiliations:** Association for Tropical Biology and Conservation (ATBC), International Phytolith Society (ISP), Ecological Society of America (ESA), Association of American Geographers (AAG), Graduate Women In Science (GWIS - Chapter Omega), Women in Science at Yale mentoring program.

**Early Career Researcher** and member of the steering committee of the Global Paleofire Working Group (PAGES) and co-leader of the modern Global Charcoal Database initiative.

**Session chair and organizer** “Savanna ecology and functioning over space and time” – upcoming Annual Conference of the European Society for Tropical Ecology (Brussels, Feb. 2017).

**Graduate Women in Science Fellowships committee member** - 2017 GWIS fellowship program.

**Workshop participation:**

“EcoRe3 – Resistance, Recovery and Resilience in Long-term Ecological Systems”, Finse, Norway (March 2017).

“Fire history baselines by biome”, Bordeaux, France (Sept. 2016)

“Mapping Human Subsistence in West Africa (1000 BC-AD 1500)”, Les Rasses, Switzerland (Nov. 2015).

“Paleofire: Data-Model Comparisons for the Past Millennium”, Harvard Forest, Massachusetts, USA (Sept. 2015).

**Workshop organization:**

- Member of the organizing committee – GPWG2 workshop “Paleofire assessment for current and future ecosystem management”, Montreal, Canada, 10-15 October 2017.
- Chair of the organizing committee – GPWG2 workshop “Africa Fire History and Ecology” (Spring 2018, location to be determined).