

Julie C. ALEMAN

Research Scientist and Postdoctoral Associate

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RESEARCH INTERESTS

Grassland and savanna ecology and conservation; tropical ecology and biogeography (savanna and forest distribution); spatial and temporal ecology; fire and disturbance ecology; climate and land-use changes

PROFESSIONAL APPOINTMENTS

- 2018-present Postdoctoral Associate – Gestion des Ressources Forestières, Gembloux AgroBioTech, Université de Liège (Belgique).
- 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

- 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

ADVANCED STAGE:

- 1- Daniau A.L., S. Desprat, **J.C. Aleman**, L. Bremond, B. Davis, W. Fletcher, J.R. Marlon, L. Marquer, V. Montade, C. Morales Del Molino, F. Naughton, D. Rius, D. Urrego. Plant microfossils in paleoenvironmental studies - pollen, microcharcoal and phytolith - towards a comprehensive understanding of vegetation, fire and climate changes. *Invited review for the Revue de Micropaléontologie*.
- 2- Hennebelle A., P. Grondin, **J.C. Aleman**, A.A. Ali, Y. Bergeron, D. Borcard, and O. Blarquez. Using paleoecology to improve reference conditions for ecosystem-based management in the western spruce-moss domain of Québec. **Under review** (*Forest Ecology and Management*)
- 3- Fayolle A., M. Swaine, A. Akomian, **J.C. Aleman**, D. Bauman, M. te Beest, E.N. Chidumayo, J. Cromsigt, M. Finckh, F.M.P. Gonçalves, J-F. Gillet, A-P. Gorel, A. Hick, R. Holdo, B. Kirunda, G. Mahy, I. McNicol, C.M. Ryan, R. Revermann, A. Plumptre, R. Pritchard, P. Nieto Quintano, C.B. Schmidt, J. Seghieri, H. Telila, A. Woolen. T. Swemmer. A sharp floristic discontinuity revealed by the biogeographic regionalization of African savannas. **In revision after review** (*Journal of Biogeography*)

PEER-REVIEWED PUBLICATIONS (* EQUAL CONTRIBUTION):

- 4- **Aleman J.C.** and A.C. Staver. Spatial interactions influence the global distribution of savanna and forest. **In press**. *Global Ecology and Biogeography*.
- 5- **Aleman J.C.**, A. Hennebelle, B. Vannièrè, and O. Blarquez. New opportunities for charcoal-based fire reconstructions to sparkle. 2018. *Fire 1(1)*: 7.
- 6- **Aleman J.C.**, Jarzyna M.A., and Staver A.C. Forest extent and deforestation in tropical Africa since 1900. 2018. *Nature Ecology & Evolution 2(1)*: 26-33.
- 7- Hawthorne D.*, Courtney-Mustaphi C.*, **Aleman J.C.***, Blarquez O., Colombaroli D., Daniau A.L., Marlon J.R., Power M., Vannièrè 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*.
- 8- **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.
- 9- **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.
- 10- 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.
- 11- **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.
- 12- **Aleman J.C.**, Blarquez O., Bentaleb I., Bonté P., Brossier B., Carcaillet C., Gond V., Gourlet-Fleury S., Lefèvre 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.

- 13- 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.
- 14- **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.
- 15- **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
- 16- 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:

- 17- Lestienne M., **Aleman J.C.**, Colombaroli D. 2018. How Paleofire Research Can Better Inform Ecosystem Management. *EOS*, 99.
- 18- 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).
- 19- Gourlet-Fleury S., and all the CoForChange collaborators (including **Aleman J.C.**) 2014. Improving the characterization of tropical forests to improve management. Policy brief – conclusion of the CoForChange program.
- 20- 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 Geograficas*: 244-249.
- 21- **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*.
- 22- 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). *Memorias Resúmenes del III Congreso Mundial de la Quinoa, 16 al 19 de Marzo de 2010*.

BOOKS AND BOOK CHAPTERS (INVITED CONTRIBUTION*):

- 23- **Aleman J.C.*** and Fayolle A. **In Press**. 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.

PUBLIC COMMUNICATIONS:

- 24- **Aleman J.C.** 2018. *Deforestation in tropical Africa is not as bad as previously thought*. The Conversation, highlighted in Phys.org, Mail & Guardian (Africa).
- 25- **Aleman J.C.** 2017. *Why the future of Africa's forests and savannas is under threat*. The Conversation: Africa, highlighted in CNBC Africa.

FELLOWSHIPS AND GRANTS

- 2017 *National Science Foundation*, 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 – \$1.5M (*Pending*)
- 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

Instructor – Département de Géographie, Université de Montréal (B.A.)

2018 Global Environmental Changes

Invited lecture (B.A.)

2016-2017 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)

2015, 2017 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)

DESS students mentoring

2018 *Kenza El Fassi* (Géographie, Université de Montréal): Lecture dirigée et étude de cas – Ecological functioning and phenology of African savannas.

2018 *Etienne Taschereau* (Géographie, Université de Montréal): Learning of phytolith extraction protocol and identification.

Master students mentoring (internship)

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

2017 *Rosie Chénard* (Geography, Université de Montréal): Reconstructing the fire history in a forest-savanna mosaic zone (Republic of Congo).

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

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.

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

Laboratory skills

Sedimentology: ^{210}Pb , ^{137}Cs and ^{14}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

Invited Seminar:

Aleman J.C. Les savanes tropicales : Influence des pratiques humaines et des changements climatiques. *Département de Géographie, Université de Montréal*. October 2017.

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. 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 Departmental seminar, *Montpellier, France*. May 2011.

Contributed conferences and workshops (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. Tropical forest and savanna distribution and patterns of transition on long-time scale. EcoRe3 PAGES workshop (Measuring components of resilience in long-term ecological datasets), *Finse, Norway*. March 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. 10th 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.* 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.*, 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

Referee:

Journal - Ecology; Global Ecology and Biogeography; Ecography; Journal of Human Evolution; Journal of Biogeography; Biological Conservations; Ecology and Society; African Journal of Ecology; PloS ONE; Scientific Reports; Journal of Vegetation Science; Palaeogeography, Palaeoclimatology, Palaeoecology; Journal of Paleolimnology; The Holocene; Review of Palaeobotany and Palynology; Journal of Micropalaeontology; International Journal of Applied Earth Observation and Geoinformation; Journal of Forestry Research; Photo Interpretation European Journal of Applied Remote Sensing; Land.

Funding - NSF Faculty Early Career Development Program (2016), NSF Collaborative Research Program (2016), GWIS Fellowship (2017), German Research Foundation (2018)

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.

Session chair and organizer:

2018. “Africa on Fire: state-of-the-art and perspectives about fire history, fire ecology and fire-vegetation-climate interactions across tropical biomes” – AFQUA, The African Quaternary Environments, Ecology and Humans. (Nairobi, July 2018).

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

Scientific committee member:

2016-present: **Member of the scientific steering committee** of the Global Paleofire Working Group (PAGES) and co-leader of the modern Global Charcoal Database initiative.

2017-present: **Graduate Women in Science Fellowships committee member.**

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” (July 2018, Nairobi, Kenya).