Gabriel Arellano

CV

Contact information

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Research interests

Tropical ecology, tropical botany, tropical forests, temperate forests, biodiversity, community ecology, metacommunity ecology, macroecology, biogeography.

Positions

- April 2015 – present: Postdoctoral fellow of the Smithsonian Tropical Research Institute (Washington DC, US).
- November 2015 – present: Honorary Associate Professor of the Universidad Rey Juan Carlos (Móstoles, Spain).
- March 2015 – present: Research Associate with the Science Action Center, The Field Museum of Natural History (Chicago, US).
- June – December 2014: Postdoctoral Researcher at the Botany Section of the Biology Department, Universidad Autónoma de Madrid (Spain).
- March 2009 – February 2013: Research Assistant at the Department of Biodiversity and Conservation of the Real Jardín Botánico – Consejo Superior de Investigaciones Científicas (Madrid, Spain).

Academic degrees

2009–2013 PhD in Biological Sciences - Evolutionary Biology and Biodiversity Program (Doctor en Ciencias Biológicas, programa de Biología Evolutiva y Biodiversidad) by the Universidad Autónoma de Madrid, Biology Department. Thesis: *Diversity, distribution and dominance patterns of woody plants in montane forests of Madidi National Park, Bolivia*. Advisor: Manuel J. Macía. Qualification: *Summa Cum Laude* (Pass with distinction [A] and honors).

2007–2009 MSc in Ecology by the Universidad Autónoma de Madrid, Ecology Department. Thesis: *Establishment of Mediterranean pastures herbs: role of seed size under different autumn moisture conditions*. Advisor: Begoña Peco. Thesis qualification: 9.8/10; MS qualification: Pass with distinction [A] and honors.

2007 MSc in Education and Pedagogy (High School level and above) (Certificado de Aptitud Pedagógica) by the Universidad de Navarra, Educational Science Institute. No qualification specified.

2002–2007 BSc in Biology by the Universidad de Navarra, Faculty of Sciences. Qualification: 2.36 / 4. Internship in the Department of Plant Biology: 2005–2007.

Other professional training

2015 Functional and phylogenetic ecology with R. AEET (Spanish Association of Terrestrial Ecology), November 23th-27th 2015, Madrid (Spain). Course taught by Nathan G. Swenson.

2014 Developing Data Products. Coursera - Johns Hopkins University, on-line course. Qualification: 100/100.

2014 Reproducible Research. Coursera - Johns Hopkins University, on-line course. Qualification: 100/100.

2014 Introduction to Data Science. Coursera - University of Washington, on-line course. Qualification: 86.8/100.

2013 Data Analysis. Coursera - Johns Hopkins University, on-line course. Qualification: 81.7/100

2013 Basic Probability. MiriadaX - Universidad Politécnica de Cartagena, on-line course. Qualification: percentile 91.

2007 Panorama de los Ecosistemas Ibéricos [Iberian Ecosystems Overview]. La Caixa Foundation. Alcobendas, Spain. October 29th-November 28th, 2007. No qualifications specified.

Participation in research projects

7. Project title: Hipótesis de los Ecotipos Fractales [Fractal Ecotypes Hypothesis]. June 2016-June 2018. PI: Manuel J. Macía (Universidad Autónoma de Madrid).
6. Project title: The Next Generation Tropical Ecosystem Experiment (NGEE) Tropics. Phase I: 2016-2018. PI: Jeffrey Q. Chambers (University of California at Berkeley).

5. Project title: Determinantes de la diversidad funcional y filogenética que explican la distribución de las plantas leñosas en los bosques andinotropicales a lo largo de gradientes altitudinales y latitudinales [Determinants of functional and phylogenetic diversity that explain the distribution of woody plants in tropical Andean montane forests along altitudinal and latitudinal gradients]. Spanish Ministry of Economy. January 1st 2015 to December 31st 2017. PI: Luis Cayuela (Universidad Rey Juan Carlos).
4. Project title: Diversidad y distribución de lianas en los bosques amazónicos del norte de Bolivia [Diversity and distribution of lianas in Amazonian forests of northern Bolivia]. CEAL Foundation (Universidad Autónoma de Madrid/Banco Santander). July 1st 2013 to December 31st 2014. PI: Manuel J. Macía (Universidad Autónoma de Madrid).
3. Project title: Florística y papel de los factores edáficos en la composición de los bosques: extensión metodológica de los bosques tropicales a los bosques templados [Floristics and the role of soil factors on the composition of forests: methodological extension from tropical forests to temperate forests]. CEAL Foundation (Universidad Autónoma de Madrid/Banco Santander). July 1st 2011 to September 1st 2012. PI: Victoria Cala (Universidad Autónoma de Madrid).
2. Project title: Understanding the spatial patterns of diversity of the montane forests in northern Bolivia. National Science Foundation. March 1st 2008 to February 29th 2012. PI: Peter M. Jørgensen (Missouri Botanical Garden).
1. Project title: Inventario florístico de los bosques montanos del Parque Nacional Madidi (Bolivia) [Floristic inventory of montane forests of Madidi National Park (Bolivia)]. CEAL Foundation (Universidad Autónoma de Madrid/Banco Santander). July 1st 2009 to December 31st 2010. PI: Manuel J. Macía (Universidad Autónoma de Madrid).

Published or accepted articles

12. **Arellano, G**., V. Cala, A. Fuentes, L. Cayola, P. M. Jørgensen, M. J. Macía. A standard protocol for woody plants inventory and soil characterization using 0.1-ha plots in forests. Accepted by *Journal of Tropical Forest Science* (October 5, 2015).
11. Granzow-de la Cerda, I., **G. Arellano**, M. Brugués, A. Solà-López. 2016. The role of distance and habitat specificity in bryophyte and perennial vascular plant metacommunities in arid scrubland fragments. *Journal of Vegetation Science*, DOI: 10.1111/jvs.12364.
10. **Arellano, G.**, P. M. Jørgensen, A. Fuentes, I. Loza, V. Torrez, M. J. Macía. 2015. Oligarchic patterns in tropical forests: role of the spatial extent, environmental heterogeneity, and diversity. *Journal of Biogeography*, DOI: 10.1111/jbi.12653.
9. Fernández, M., L. M. Navarro, A. Apaza-Quevedo, S. C. Gallegos, A. Marques, C. Zambrana-Torrelio, F. Wolf, H. Hamilton, A. J. Aguilar-Kirigin, L. F. Aguirre, M. Alvear, J. Aparicio, L.

Apaza-Vargas**, G. Arellano**, E. Armijo, N. Ascarrunz, S. Barrera, S. G. Beck, H. Cabrera-Condarco, C. Campos-Villanueva, L. Cayola, N. Paola Flores-Saldana, A. F. Fuentes, M. C. García-Lino, M. I. Gómez, Y. S. Higueras, M. Kessler, J. C. Ledezma, J. M. Limachi, Ramiro P. López, M. I. Loza, M. J. Macía, R. I. Meneses, T. B. Miranda, A. B. Miranda-Calle, R. F. Molina-Rodriguez, M. Moraes R., M. I. Moya-Diaz, M. Ocampo, H. L. Perotto-Baldivieso, O. Plata, S. Reichle, K. Rivero, R. Seidel, L. Soria, M. F. Terán, M. Toledo, F. S. Zenteno-Ruiz & H. M. Pereira. 2015. Challenges and opportunities for the Bolivian Biodiversity Observation Network. *Biodiversity*, DOI: 10.1080/14888386.2015.1068710.

8. **Arellano, G**., J. S. Tello, P. M. Jørgensen, A. F. Fuentes, M. I. Loza, V. Torrez, M. J. Macía. 2016. Disentangling species turnover of woody plants in a tropical forest: from local to regional scales. *Oikos*, 125: 326-335. DOI: 10.1111/oik.02426.
7. Tello, J.S., J. A. Myers, M. J. Macía, A. F. Fuentes, L. Cayola, **G. Arellano**, M. Isabel Loza, V. Torrez, M. Cornejo, T. B. Miranda, P. M. Jørgensen. 2015. Elevational gradients in β-diversity reflect variation in the strength of local community assembly mechanisms across spatial scales. PlosONE 10, e0121458.
6. **Arellano, G**., M. I. Loza, J. S. Tello, M. J. Macía. 2015. Commonness and rarity determinants of woody plants in different types of tropical forests. *Biodiversity and Conservation* 24: 1073-1087.
5. **Arellano, G**., V. Cala, M. J. Macía. 2014. Niche breadth of oligarchic species in Amazonian and Andean rainforests. *Journal of Vegetation Science* 25: 1355-1366.
4. **Arellano, G.**, L. Cayola, I. Loza, V. Torrez, M. J. Macía. 2014. Commonness patterns and the size of the species pool along a tropical elevational gradient: insights using a new quantitative tool. *Ecography* 37: 536-543.
3. **Arellano, G**. & M. J. Macía. 2014. Local and regional dominance of woody plants along an elevational gradient in a tropical montane forest of northwestern Bolivia. *Plant Ecology* 215: 39-54.
2. **Arellano, G**. & B. Peco. 2012. Testing the role of seed size in annual legume seedling performance under experimental autumn moisture conditions. *Journal of Vegetation Science* 23: 690-697.
1. Barrios, B., **G. Arellano**, & S. Koptur. 2011. The effects of fire and fragmentation on occurrence and flowering of a rare perennial plant. *Plant Ecology* 212: 1057-1067.

Published book chapters

3. **Arellano, G**. 2012. Naturaleza en el códice de Martínez Compañón (1782-1785). In: I. Arellano & C. Mata (eds.). El obispo Martínez Compañón: vida y obra de un navarro ilustrado en América. Pamplona, Gobierno de Navarra, pp. 203-215.

2. **Arellano, G**. 2011. Plantas en la Breve relación del capitán Juan Recio de León, 1623. In: Latasa, P. (ed.) Discursos coloniales: texto y poder en la América hispana. Universidad de Navarra, Iberoamericana/Vervuert, John Carter Brown Library. Pamplona/Madrid/Frankfurt am Main Biblioteca Indiana, 31, pp. 43-53.
1. **Arellano, G**. 2011. Relación planta-ambiente: una relación complicada y poco conocida. In: Cornejo-Mejía, M., P. Jørgensen, M.J. Macía, I. Loza, A. Fuentes & L. Cayola (eds.). Memorias de los 10 años de investigación botánica realizada en la Región Madidi: "conociendo una de las regiones más biodiversas del mundo". Herbario Nacional de Bolivia, Missouri Botanical Garden. La Paz, Bolivia.

In preparation

- **Arellano, G.**, M. N. Umaña, M. J. Macía, A. Fuentes, L. Cayola, I. Loza, M. Cornejo, T. Miranda, P. M. Jørgensen. The role of niche overlap, environmental heterogeneity, landscape roughness and productivity in shaping species abundance distributions along the Amazon-Andes gradient. In review by *Global Ecology and Biogeography*.
- **Arellano, G.**, I. Loza, J. S. Tello, V. Torrez, P. M. Jørgensen, A. F. Fuentes, M. J. Macía. Trees, shrubs, treelets and lianas show different patterns of rarity-commonness in Amazonian and Andean rainforests. In preparation for invited re-submission to *Journal of Tropical Ecology*.
- Loza, M. I., I. Jimenez, P. M. Jørgensen, **G. Arellano**, A. Fuentes, L. Cayola, M. Cornejo, T. Miranda, M. J. Macía, R. E. Ricklefs. Phylogenetic patterns of rarity in a regional species pool of tropical woody plants. To be sent to *Global Ecology and Biogeography* after a final approval by all co-authors.
- **Arellano, G.**, V. Cala, M. J. Macía. Soil and woody plants distribution in a tropical Andean rainforest: integrating the multi-layered nature of soils. In preparation (90%).
- **Arellano, G.**, L. Cayola, M. Cornejo, A. Fuentes, P. M. Jørgensen, I. Loza, T. Miranda, M. J. Macía. Species-individualism and multi-scale assembly of tropical forest oligarchies. In preparation (80%).
- **Arellano, G.**, N. C. A. Pitman, M. J. Macía. A distance-based approach to beta-commonness. In preparation (60%).
- Muñoz, M., **G. Arellano**, M. J. Macía, *et al*. Comparing the effect of dispersal limitation and environmental filtering on beta-diversity patterns along altitudinal and latitudinal ranges. In preparation (50%).

- Macía, M. J., V. Cala, **Arellano, G.** Amazonian forest floristics and plant-soil relationships: role of total *vs*. available nutrients. In preparation (50%).
- Tello, J. S., I. Jiménez, P. M. Jørgensen, M. I. Loza-Rivera, J. A. Myers, M. J. Macía, A. F. Fuentes-Claros, L. E. Cayola-Pérez, **G. Arellano**, M. Cornejo-Mejía, and V. W. Torrez. The evolutionary and ecological assembly of a tropical flora along an elevational gradient in the Andes. In preparation (50%).
- Loza, M. I., I. Jimenez, P. M. Jørgensen, **G. Arellano**, A. Fuentes, L. Cayola, M. Cornejo, T. Miranda, M. J. Macía, J. S. Tello. Rarity in woody plants of the Madidi region (Bolivia). In preparation (40%).

Other publications

- **Arellano, G**. 2007-2009. 68 science divulgation articles during a two-years contract as Genciencia editor (Weblogs SL); <http://www.genciencia.com/autor/gabriel-a.>.
- Atienza, A. C. 1936. *El idioma katío*. Edition of I. Arellano and **G. Arellano**. Iberoamericana, 2002, 174 pp. ISBN 8484890309.

Participation in professional meetings

13. 29th European Conference of Tropical Ecology. Göttingen, Germany. February 23rd-26th 2016. **Organizer of**: Session "Patterns and processes of species dominance in tropical forests". **Talk**: Arellano, G. & M. J. Macía. Oligarchicity or co-dominance across scales in tropical forests. **Poster**: Arellano, G., V. Cala, A. Fuentes, L. Cayola, P. M. Jørgensen & M. J. Macía. 2016. A standard protocol for woody plant inventories and soil characterization using temporary 0.1-ha plots in tropical forests.
12. XIII European Ecological Federation and the XXV Società Itaiana di Ecologia's joint conference. Rome, Italy. September 21st-25th 2015. **Talk**: Arellano, G., M. J. Macía & The Madidi Project. Oligarchicity = commonness in the space: insigths from the Madidi region.
11. 3rd meeting of the Network for Neotropical Biogeography. Bogotá, Colombia. January 9th-10th 2014. **Talk**: Jiménez, I., I. Loza, S. Tello, P. Jørgensen, A. F. Fuentes, L. Cayola, M. Cornejo, M. J. Macía, G. Arellano, T. B. Miranda, J. Quisbert-Quispe, and V. Torrez. Assembly of a regional flora in the tropical Andes.
10. 60th Annual Systematics Symposium of the Missouri Botanical Garden. October 11st-13rd 2013. **Talk**: Tello, J. S., I. Jiménez, P. M. Jørgensen, M. I. Loza-Rivera, J. A. Myers, M. J. Macía, A. F. Fuentes-Claros, L. E. Cayola-Pérez, G. Arellano, M. Cornejo-Mejía, and V. W. Torrez. The

evolutionary and ecological assembly of a tropical flora along an elevational gradient in the Andes.

9. 50th Anniversary Meeting of the Association for Tropical Biology and Conservation. San José, Costa Rica. June 13rd-27th, 2013. **Talk**: Tello, J. S., I. Jiménez, P. Jørgensen, J. A. Myers, M. J. Macía, A. F. Fuentes-Claros, L. Cayola-Pérez, G. Arellano, M. Cornejo-Mejía, M. I. Loza-Rivera, J. Quisbert-Quispe, V. W. Torrez. Elevational gradients in beta-diversity reflect both regional effects and scale-dependent variation in the strength of local assembly processes.
8. II Congreso Boliviano de Botánica. La Paz, Bolivia. October 11st-13rd, 2012. **Talk**: Tello, J. S., I. Jiménez, P. Jørgensen, J. A. Myers, M. J. Macía, A. F. Fuentes-Claros, L. Cayola-Pérez, G. Arellano, M. Cornejo-Mejía, M. I. Loza-Rivera, J. Quisbert-Quispe, V. W. Torrez. Efectos de γ-diversidad y muestreo en la β-diversidad a lo largo de un gradiente elevacional en Bolivia.
7. 97th Annual Meeting of the Ecological Society of America. Portland, U.S.A. August 5th-10th, 2012. **Talk**: Tello, J. S., I. Jiménez, P. Jørgensen, J. A. Myers, M. J. Macía, A. F. Fuentes-Claros, L. Cayola-Pérez, G. Arellano, M. Cornejo-Mejía, M. I. Loza-Rivera, J. Quisbert-Quispe, V. W. Torrez. Beta-diversity, gamma diversity, and community assembly along a tropical elevational gradient.
6. 54th Symposium of the International Association for Vegetation Science. Lyon, France. June 20th-24th, 2011. **Talk**: Arellano, G. & B. Peco. Mediterranean grassland seedling establishment: the role of seed weight under different autumn moisture conditions.
5. Poster presented in the X Congreso Latinoamericano de Botánica. La Serena, Chile. October 4th-10th, 2010. **Poster**: Arellano, G. & M. J. Macía. Un protocolo estandarizado para el establecimiento de parcelas temporales de 0.1 ha en bosques tropicales.
4. The Florida Native Plant Society 30th Annual Conference. Tallahassee, U.S.A. May 20th-23th, 2010. **Talk**: Barrios, B., G. Arellano & S. Koptur. Fire, flowering, and fragmentation: The effect of fires on the biology of pineland golden trumpet (*Angadenia berteroi*), a rare species of the pine rocklands.
3. The Florida Rare Plant Task Force Meeting. Lake Wales, U.S.A. April 29th, 2010. **Talk**: Barrios, B., G. Arellano & S. Koptur. Fire, flowering and fragmentation: The effects of fire on the reproductive biology of pinelad allamanda (*Angadenia berteroi*), a rare shrub of the pine rockland.
2. Pine Rockland Conference 2010. Miami, U.S.A. February 10th-13th, 2010. **Talk**: Barrios, B., G. Arellano & S. Koptur. Fire, flowering and fragmentation: The effect of fires on the biology of pineland golden trumpet (*Angadenia berteroi*), a rare species of the pine rocklands.
1. Botany & Mycology 2009. Snowbird, U.S.A. July 25th-29th, 2009. **Talk**: Barrios, B., G. Arellano & S. Koptur. Fire, flowering, and fragmentation: the effect of seasonal fires on the occurrence of

pineland golden trumpet (*Angadenia berteroi*), a rare species of the southern Florida pine rocklands.

Research stays abroad

- Universidad Técnica Particular de Loja (Ecuador). March 14th-April 25th, 2015. Funded by BOTROPANDES (~3000 US$).
- Missouri Botanical Garden (St Louis, U.S.A.). June 1st-30th, 2012. Funded by Universidad Autónoma de Madrid (~3000 US$).
- Herbario Nacional de Bolivia (Universidad Mayor de San Andrés, La Paz, Bolivia). Visiting researcher during the realization of the PhD thesis. July 2009-May 2011. Partially funded by Universidad Autónoma de Madrid (~7000 US$).
- Fairchild Tropical Botanical Garden (Miami, U.S.A). Temporal membership as a Florida International University student. September 25th-December 17th, 2008.
- Florida International University (Miami, U.S.A.), Department of Biology. August 21th-December 13th, 2008. Funded by Fundación Bancaja (~2000 US$).

Teaching and mentoring

- Teaching Assistant in "Plants, Economy and Society" course, Universidad Autónoma de Madrid, Spring Semester, 2012.
- Advisor of Miguel Muñoz (grade thesis): Patrones de diversidad y composición florística del bosque caducifolio del Noroeste de la Península Ibérica en función de las variables ambientales [Patterns of diversity and floristic composition of deciduous forest of the Northwestern Iberian Peninsula as a function of environmental variables]. Universidad Autónoma de Madrid, Spain. 2011-2013.
- Advisor of Pablo Solíz (grade thesis): Evaluación de la diversidad y composición florística en dos localidades dentro del A.N.M.I. Apolobamba [Evaluation of diversity and floristic composition in two locations within the A.N.M.I. Apolobamba]. Universidad Mayor de San Andrés, Bolivia. 2009-present.

Experience in botanical inventories

- *3303 collection numbers; leading 295 field days of inventory expeditions*.
- 2 0.1-ha plots in high Andean forests (Ecuador, 2015), responsible of 6 people, in collaboration with Jorge L. Armijos (inforja.ec@gmail.com).

- 8 0.1-ha plots in Amazonian forests (Bolivia, 2014), responsible of 6 people, in collaboration with Beatriz Nieto (sonneratia@gmail.com).
- Collaborator during the census and re-census of permanent saplings plots in Luquillo tropical forest (Puerto Rico, 2012, 2013, 2015), supervised by Mª Natalia Umaña (maumana@gmail.com).
- 22 0.1-ha plots in temperate forests (Spain, 2011), responsible of 1-3 people.
- 54 0.1-ha plots in Andean forests (Bolivia, 2009-2010), responsible of 3-7 people.
- Adaptive Cluster Sampling in *Pineland rocklands* (Florida, U.S.A., 2008), supervised by Beyte Barrios (bbarr006@fiu.edu).
- 20 225-m^2 plots in *Fagus sylvatica* forests (Spain, 2006).

Personal and professional references

- Manuel J. Macía, PhD. Departamento de Biología, Área de Botánica, Universidad Autónoma de Madrid; Campus de Cantoblanco, C/ Darwin, 2, 28049 Madrid (Spain). E-mail: manuel.macia@uam.es. Phone: (+34) 914978107. He was my PhD advisor and is still the main collaborator for my current projects. He could inform you about my overall research work, my quantitative skills, and general aspects of me and my work.
- J. Sebastián Tello, PhD. Center for Conservation and Sustainable Development. Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166-0299 (USA). E-mail: jsebastiantello@gmail.com. Phone: (+1) 314-577-5846. He is a quantitative ecologist with whom I collaborate in the quantitative aspects for our shared projects, including the most heavy programming tasks. He could inform you about my overall quantitative and analytical skills, and could provide a technical opinion on how I work (data management, reproducible research, version control, etc).