

Curriculum Vitae (May 2017)

XAVIER ARNAN

- **Personal information**

Date of Birth: April 3, 1978; Place of Birth: Castellbell i el Vilar, Spain

Nationality: Spanish; Passport Number: AAI609803

- **Address**

CREAF (Centre de Recerca Ecològica i Aplicacions Forestals)

Campus de Bellaterra (UAB) Edifici C

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Catalunya, Spain

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- **Education**

PhD in Biology at the Unit of Ecology, Autonomous University of Barcelona. Dissertation title: "Post-fire dynamics and interactions between Mediterranean plants and ants". Advisors: Javier Retana and Anselm Rodrigo. 7th April 2006. Qualification: cum laude.

Diploma of Advanced Studies in Biology (option Ecology) at the Autonomous University of Barcelona. November, 2004.

MSc degree in Biology at the Unit of Ecology, Autonomous University of Barcelona. 13th July 2004.

Doctoral studies at the Ecology Unit of the Autonomous University of Barcelona. 2002-2006.

Graduate in Biology at the Autonomous University of Barcelona. June, 2001.

Bachelor's degree in Biology at the Autonomous University of Barcelona. 1996-2001.

- **Positions**

May 2017-present. Ramón y Cajal researcher at the Centre for Ecological Research and Forestry Applications, Barcelona, Spain.

June 2014-April 2017. Postdoctoral senior researcher at the Department of Botany of the Federal University of Pernambuco (Brazil), Plant-Animal Interactions Lab headed by Professor Dr. Inara R. Leal.

January 2012-September 2013. Postdoctoral researcher at the Department of Biology of the Technische Universität Darmstadt (Germany), Ecological networks group headed by Professor Dr. Nico Blüthgen.

December 2008 – November 2011. Postdoctoral researcher at the Ecology Unit of the Autonomous University of Barcelona (UAB), Barcelona, Spain.

June 2006 - November 2008. Postdoctoral researcher at the Centre for Ecological Research and Forestry Applications (CREAF), Barcelona, Spain.

February 2007 – August 2007. Assistant Professor (category A2/6) at the Ecology Unit of the Autonomous University of Barcelona, Barcelona, Spain.

January 2002 – April 2006. Doctoral studies at the Ecology Unit of the Autonomous University of Barcelona (UAB), Barcelona, Spain.

- **Research interests**

I am a terrestrial ecologist mainly interested in a) taxonomic, functional and phylogenetic diversity patterns along environmental and disturbance gradients; b) the role of competition and disturbance in the modulation of ant communities; and c) plant-animal interactions (mainly plant-ant and plant-pollinator).

- **Publications**

Science Citation Index (SCI):

- 45.- Gibb H, Dunn RR, Sanders NJ, Grossman BF, Photakis M, Abril S, Agosti D, Andersen AN, Angulo E, Armbrrecht I, **Arnan X**, Baccaro FB, Bishop TR, Boulay R, Brühl C, Castracani C, Cerdá X, Del Toro I, Delsinne T, Diaz M, Donoso DA, Ellison AM, Enriquez ML, Fayle TM, Feener DH Jr, Fisher BL, Fisher RN, Fitzpatrick MC, Gómez C, Gotelli NJ, Gove A, Grasso DA, Groc S, Guenard B, Gunawardene N, Heterick B, Hoffmann B, Janda M, Jenkins C, Kaspari M, Klimes P, Lach L, Laeger T, Lattke J, Leponce M, Lessard JP, Longino J, Lucky A, Luke SH, Majer J, McGlynn TP, Menke S, Mezger D, Mori A, Moses J, Munyai TC, Pacheco R, Paknia O, Pearce-Duvel J, Pfeiffer M, Philpott SM, Resasco J, Retana J, Silva RR, Sorger MD, Souza J, Suarez A, Tista M, Vasconcelos HL, Vonshak M, Weiser MD, Yates M, Parr CL. (2017) A global database of ant species abundances. *Ecology*, 98, 883-884. doi: 10.1002/ecy.1682
- 44.- Doblas-Miranda E., Alonso R., **Arnan X**, Bermejo V., Brotons L., de las Heras J, Estiarte M., Hodar J.A., Llorens P., Lloret F., López F.R., Martínez-Vilalta J., Moya D., Peñuelas J., Pino J., Rodrigo A., Roura N., Valladares F., Vilà M., Zamora R. & Retana J. (2017) A review of the combination among global change factors in forests, shrublands and pastures of the Mediterranean Region: Beyond drought effects. *Global and Planetary Change*, 148, 42-54. <http://dx.doi.org/10.1016/j.gloplacha.2016.11.012>
- 43.- Parr C.L., Dunn R.R., Sanders N.J., Weiser M.D., Photakis M., Fitzpatrick M.C., **Arnan X**, Baccaro F., Bishop T.R., Brandão C.R.F., Chick L., Donoso D.A., Fayle T.M., Gómez C., Grossman B., Munyai T.C., Pacheco R., Retana J., Sagata K., Silva R.R., Tista M., Vasconcelos H., Yates M. & Gibb H. (2017) GLobal Ants trait Database (GLAD): a new database on the geography of ant traits (Hymenoptera: Formicidae). *Insect Conservation and Diversity*, 10, 5-20. doi: 10.1111/icad.12211
- 42.- **Arnan X**, Cerdá X. & Retana J. (2017) Relationships among taxonomic, functional, and phylogenetic ant diversity across the biogeographic regions of Europe. *Ecography*, 40, 448-457. doi:10.1111/ecog.01938
- 41.- Osorio S., **Arnan X**, Rodrigo A., Torné-Noguera A., Molowny-Horas R. & Bosch J. (2016) Body size phenology in a regional bee fauna: a temporal extension of Bergmann's rule. *Ecology Letters*, 19, 1395-1402.
- 40.- Ribeiro-Neto J.D., **Arnan X**, Tabarelli M. & Leal I.R. (2016) Chronic anthropogenic disturbance causes homogenization of plant and ant communities in the Brazilian Caatinga. *Biodiversity and Conservation*, 25, 943-956. doi: 10.1007/s10531-016-1099-5
- 39.- Sgolastra F., **Arnan X**, Pitts-Singer T., Maini S., Kemp W. & Bosch J. (2016) Pre-wintering conditions and post-winter performance in a solitary bee: does diapause impose an energetic cost on reproductive success? *Ecological Entomology*, 41, 201-210. doi: 10.1111/een.12292
- 38.- **Arnan X**, Blüthgen N., Molowny-Horas R. & Retana J. (2015) Thermal characterization of European ant communities along thermal gradients and its implications for community resilience to temperature variability. *Frontiers in Ecology and Evolution*, 3, 138. doi: 10.3389/fevo.2015.00138
- 37.- **Arnan X**. & Blüthgen N. (2015) Using eco-physiological traits to predict climatic and activity niches: lethal temperature and water loss in Mediterranean ants. *Global Ecology and Biogeography*, 12, 1454-1464. doi: 10.1111/geb.12363
- 36.- **Arnan X**, Cerdá X. & Retana J. (2015) Partitioning the impact of environment and spatial structure on alpha and beta components of taxonomic, functional, and phylogenetic diversity in European ants. *PeerJ*, 3, e1241. doi 10.7717/peerj.1241
- 35.- Retana J., **Arnan X**. & Cerdá X. (2015) A multidimensional functional trait analysis of resource exploitation in European ants. *Ecology*, 96, 2781-2793.
- 34.- Gibb H., Sanders N.J., Dunn R.R., Photakis M., Andersen A.N., Angulo E., Armbrrecht I., **Arnan X**, et al. (2015) Climate regulates the effects of anthropogenic disturbance on ant assemblage structure. *Proceedings of the Royal Society B: Biological Sciences*, 282, 20150418.

- 33.- Osorio S., **Arnan X.**, Bassols E., Vicens N. & Bosch J. (2015) Local and landscape effects in a host-parasitoid interaction network along a forest-cropland gradient. *Ecological Applications*, 25, 1869-1879.
- 32.- Quevedo L., **Arnan X.** & Rodrigo A. (2015) Post-fire forestry management improves fruit weight and seed set in forest coppices dominated by *Arbutus unedo* L. *Forest Ecology and Management*, 345, 65-72. doi:10.1016/j.foreco.2015.02.030
- 31.- Boulay* R., **Arnan* X.**, Cerdá X. & Retana J. (2014) The ecological benefits of larger colony size may promote polygyny in ants. *Journal of Evolutionary Biology*, 27, 2856-2863. doi: 10.1111/jeb.12515
- 30.- Quevedo L., **Arnan X.**, Boet O. & Rodrigo A. (2014) Post-fire selective thinning of *Arbutus unedo* L. coppices keeps animal diversity unchanged: the case of ants. *Annals of Forest Science*, 71, 897-905. doi: 10.1007/s13595-014-0381-5
- 29.- **Arnan X.**, Cerdá X. & Retana J. (2014) Ant functional responses along environmental gradients. *Journal of Animal Ecology*, 83, 1398-1408. doi: 10.1111/1365-2656.12227
- 28.- **Arnan X.**, Escolà A., Rodrigo A. & Bosch J. (2014) Female reproductive success in gynodioecious *Thymus vulgaris*: pollinator foraging behaviour and pollen versus nutrient limitation. *Botanical Journal of the Linnean Society*, 175, 395-408. doi: 10.1111/boj.12173
- 27.- Torné-Noguera A., Rodrigo A., **Arnan X.**, Osorio S., Barril-Graells H., Correia L. & Bosch J. (2014) Determinants of spatial distribution in a bee community: nesting resources, flower resources, and body size. *PLoS ONE*, 9, e97255. doi:10.1371/journal.pone.0097255
- 26.- **Arnan X.**, Comas L., Gracia M. & Retana J. (2014) Composition and habitat use of small mammals in old-growth mountain forests. *Journal of Natural History*, 48, 481-494. doi: 10.1080/00222933.2013.800611
- 25.- Caut S., Jowers M.J., **Arnan X.**, Pearce-Duvel J., Rodrigo A., Cerdá X. & Boulay R. (2014) The effect of fire on ant trophic assemblage and sex allocation. *Ecology and Evolution*, 4, 35-49. doi: 10.1002/ece3.714
- 24.- Pino J., **Arnan X.**, Rodrigo A. & Retana J. (2013) Are wildfires a window of opportunity for *Coryza* spp. invasion in Mediterranean forests? A diachronic study. *Weed Research*, 6, 470-478.
- 23.- **Arnan X.**, Cerdá X., Rodrigo A. & Retana J. (2013) Response of ant functional composition to fire. *Ecography*, 36, 1182-1192.
- 22.- Lázaro-González A., **Arnan X.**, Boulay R., Cerdá X. & Rodrigo A. (2013) Short-term ecological and behavioural responses to wildfire of a Mediterranean ant species, *Aphaenogaster gibbosa* (Latr. 1798). *Insect Conservation and Diversity*, 6, 627-638.
- 21.- Andersen A.N., **Arnan X.** & Sparks K. (2013) Limited niche differentiation within remarkable co-occurrences of congeneric species: *Monomorium* ants in the Australian seasonal tropics. *Austral Ecology*, 38, 557-567.
- 20.- Cerdá X., **Arnan X.** & Retana J. (2013) Is competition a significant hallmark of ant (Hymenoptera: Formicidae) ecology? *Myrmecological News*, 18, 131-147.
- 19.- Quevedo L., **Arnan X.** & Rodrigo A. (2013) Selective thinning of *Arbutus unedo* coppices following fire: effects on growth at the individual and plot level. *Forest Ecology and Management*, 292, 56-63.
- 18.- **Arnan X.**, Quevedo L. & Rodrigo A. (2013) Forest fire occurrence increases the distribution of a rare forest type in the Mediterranean basin. *Acta Oecologica*, 46, 39-47.
- 17.- **Arnan X.**, Cerdá X. & Retana J. (2012) Distinctive life traits and distribution along environmental gradients of dominant and subordinate Mediterranean ant species. *Oecologia*, 170, 489-500.
- 16.- **Arnan X.**, Molowny-Horas R., Rodrigo A. & Retana J. (2012) Uncoupling the effects of seed predation and seed dispersal by granivorous ants on plant population dynamics. *PLoS ONE* 7(8): e42869. doi:10.1371/journal.pone.0042869
- 15.- Rodrigo A., **Arnan X.** & Retana J. (2012) Relevance of soil seed bank and seed rain on seed supply after a large wildfire. *International Journal of Wildland Fire*, 21, 449-458.
- 14.- **Arnan X.**, López B.C., Martínez-Vilalta J., Estorach M. & Poyatos R. (2012) The age of monumental olive trees (*Olea europaea*) in northeastern Spain. *Dendrochronología*, 30, 11-14.

- 13.- **Arnan X.**, Rodrigo A. & Retana J. (2011) What are the consequences of ant-plant interactions on the abundance of two dry-fruited shrubs in a Mediterranean scrub? *Oecologia*, 167, 1027-1039.
- 12.- Espelta J.M., **Arnan X.** & Rodrigo A. (2011) Non-fire induced seed release in a weak serotinous pine: climatic factors, maintenance costs or both? *Oikos*, 120, 1752-1760.
- 11.- **Arnan X.**, Ferrandiz-Rovira M., Pladevall C. & Rodrigo A. (2011) Worker size-related task partitioning in the foraging strategy of a seed-harvesting ant species. *Behavioural Ecology and Sociobiology*, 65, 1881-1890.
- 10.- **Arnan X.**, Bosch J., Comas L., Gracia M. & Retana J. (2011) Habitat determinants of abundance, structure and composition of flying Hymenoptera communities in mountain old-growth forests. *Insect Conservation and Diversity*, 4, 200-211.
- 9.- Jenkins C.N., Sanders N.J., Andersen A.N., **Arnan X.**, Brühl A., Cerdá X., Ellison A.M., Fisher B.L., Fitzpatrick M.C., Gotelli N.J., Gove A.D., Guénard B., Lattke J.E., Lessard J.P., McGlynn T.P., Menke S.B., Parr C.L., Philpott S.M., Vasconcelos H.L., Weiser M.D. & Dunn R.R. (2011) Global diversity in light of climate change: the case of ants. *Diversity and Distributions*, 17, 652-662.
- 8.- **Arnan X.**, Gaucherel C. & Andersen A.N. (2011) Dominance and species co-occurrence in highly diverse ant communities: a test of the interstitial hypothesis and discovery of a competition cascade. *Oecologia*, 166, 783-794.
- 7.- **Arnan X.**, Retana J., Rodrigo A. & Cerdá X. (2010) Foraging behaviour of harvesting ants determining seed removal and dispersal. *Insectes Sociaux*, 57, 421-430.
- 6.- **Arnan X.**, Rodrigo A., Molowny-Horas R. & Retana J. (2010) Ant-mediated expansion of an obligate seeder species during the first years after fire. *Plant Biology*, 12, 842-852.
- 5.- **Arnan X.**, Gracia M., Comas L. & Retana J. (2009) Forest management conditioning ground ant community structure and composition in temperate conifer forests in the Pyrenees Mountains. *Forest Ecology and Management*, 258, 51-59.
- 4.- Dunn R.R., Agosti D., Andersen A.N., **Arnan X.**, Bruhl C.A., Cerdá X., Ellison A.M., Fisher B.L., Fitzpatrick M.C., Gibb H., Gotelli N.J., Gove A.D., Guenard B., Janda M., Kaspari M.E., Laurent E.J., Lessard J.P., Longino J.T., Majer J.D., Menke S.B., McGlynn T.P., Parr C.L., Philpott S.M., Pfeiffer M., Retana J., Suarez A.V. & Vasconcelos H.L., Weiser M.D., Sanders N.J. (2009) Climatic drivers of hemispheric asymmetry in global patterns of ant species richness. *Ecology Letters*, 12, 324-333.
- 3.- **Arnan X.**, Rodrigo A. & Retana J. (2007) Uncoupling the effects of shade and food resources of vegetation on Mediterranean ants: an experimental approach at the community level. *Ecography*, 30, 161-172.
- 2.- **Arnan X.**, Rodrigo A. & Retana J. (2007) Post-fire regeneration of Mediterranean plant communities at a regional scale is dependent on vegetation type and dryness. *Journal of Vegetation Science*, 18, 111-122.
- 1.- **Arnan X.**, Rodrigo A. & Retana J. (2006) Post-fire recovery of Mediterranean ground ant communities follows vegetation and dryness gradients. *Journal of Biogeography*, 33, 1246-1258.

Other publications (no SCI):

- Gibb H., Sanders N.J., Dunn R.R., Abril S., Angulo E., Armbrrecht I., **Arnan X.**, Baccaro F., Bishop, T.R., Boulay R., Castracani C., Chick L., Del Toro I., Delsinne T., Donoso D., Enriquez M.L., Fayle T.M., Fitzpatrick M., Gibb H., Glasier J., Gómez C., Groc S., Grossman B., Gunawardene N., Heterick B., Hoffmann B., Klimes P., Lach L., Laeger T., Lattke J., Leponce M., Longino J., Lucky A., Luke S., Menke S., Mezger D., Moses J., Munyai T.C., Pacheco R., Paknia, O., Pearce-Duvel J., Pfeiffer M., Philpott S., Resasco J., Retana J., Sagata K., Silva R.R., Sorger D.M., Souza J., Suarez A., Tista M., Vasconcelos H.L., Vonshak M., Yates M., & Parr C.L. (2015) The Global Ants Database. <http://globalants.org/>
- Boet O., **Arnan X.**, Gràcia M., Comas L., Retana J. (2012) Efectes de la gestió forestal sobre les comunitats de formigues en el Parc Nacional d'Aigüestortes i Estany de Sant Maurici. In: La investigació al Parc Nacional d'Aigüestortes i Estany de Sant Maurici. IX Jornades sobre Recerca al Parc Nacional d'Aigüestortes i Estany de Sant Maurici. Departament de Medi Ambient i Habitatge, Generalitat de Catalunya. Pp. 183-191.

- Retana J., **Arnan X.**, Arianoutsou M., Barbati A., Kazanis D. & Rodrigo A. (2011) Post-fire Management of non-serotinous pine forests. In: Post-fire management and restoration of southern European forests (Moreira F., Arianoutsou M., Corona P. & De las Heras J. eds). Managing Forest Ecosystems Series, Vol. 24. Springer, pp. 329. ISBN 978-94-007-2207-1
- Arnan X.** (2011) Hormigas cortadoras de hojas. El superorganismo supremo. Bibliographic notice of: The leaf cutter ants. Civilization by instinct. *Investigación y ciencia*, 420, 95.
- Gracia M., Ordoñez J.L. (eds.) **Arnan, X.**, Gracia, M., et al. (2011) Les pinedes de pi roig. In: Manuals de gestió d'hàbitats. Diputació de Barcelona.
- Gracia M., Ordoñez J.L. (eds.) **Arnan, X.**, Gracia, M., et al. (2011) Les pinedes de pinassa. In: Manuals de gestió d'hàbitats. Diputació de Barcelona.
- Rodrigo A., **Arnan X.** & Retana J. (2010) És homogènia la recuperació, després del foc, de les comunitats de plantes i de formigues dels boscos de Catalunya? *Treballs de la Societat Catalana de Geografia*, 71, 121-140.
- Boet O. & **Arnan X.** (2010) Les formigues roges en els boscos de pi negre. *El Portarró*, 28, 7-9.
- Gracia M., Ordoñez J.L. (eds.) **Arnan, X.**, Gracia, M., et al. (2010) Les pinedes de pi blanc. In: Manuals de gestió d'hàbitats. Diputació de Barcelona.
- Comas L., Bosch J., **Arnan X.**, Gràcia M. & Retana J. (2009) Importància del grau de maduresa de boscos subalpins sobre la comunitat d'himenòpters voladors. In: La investigació al Parc Nacional d'Aigüestortes i Estany de Sant Maurici. VIII Jornades sobre Recerca al Parc Nacional d'Aigüestortes i Estany de Sant Maurici. Departament de Medi Ambient i Habitatge, Generalitat de Catalunya. Pp 77-87.
- Comas L., **Arnan X.**, Gracia M, Retana J. & Bosch J. (2009) Relación entre el grado de madurez del bosque y las comunidades de himenópteros voladores y micromamíferos en el Parque Nacional de Aigüestortes i Estany de Sant Maurici". In "Proyectos de investigación en Parques Nacionales: 2006-2009" (eds. Ramírez L. & Asensio B.). Organismo Autónomo Parques Nacionales. Pp 327-341
- Martínez-Vilalta J., Claramunt B.L., **Arnan X.**, Estorach M. & Poyatos R. (2009) L'edat de les oliveres monumentals i singulars del Montsià. *Raïls*, 25, 208-221.
- Espelta J.M., **Arnan X.**, Verkaik I. & Guitart, L. (2008) Evaluación ecológica de diferentes tratamientos silvícolas de mejora de la regeneración natural en zonas afectadas por incendios y sequías extremas. En: Modelos silvícolas en bosques privados mediterráneos. Oficina Tècnica Municipal de Prevenció d'Incendis Forestals, Diputació de Barcelona.
- Boet O., **Arnan X.** & Rodrigo A. (2003) Efectes dels incendis forestals sobre les comunitats de formigues. *Monografies del Montseny*, 18, 145-161.

Conference papers:

- Quevedo Dalmau L., Rodrigo Domínguez A. & Arnan Viadiu X. (2013) Mejora de la estructura del monte bajo de *Arbutus unedo*, por efecto de talas post incendio. In: Actas del 6º Congreso Forestal Español.
- Comas L., Arnan X., Gràcia M., Retana J. & Bosch J. (2009) Importancia del grado de madurez del bosque sobre las comunidades de himenópteros voladores y micromamíferos en el Parque Nacional de Aigüestortes i Estany de Sant Maurici. In: Actas del 5º Congreso Forestal Español. Montes y sociedad: Saber qué hacer, 42, 2-10.

Submitted manuscripts:

- Gibb H., Sanders N.J., Dunn R.R., **Arnan X.**, Vasconcelos H.L., Donoso D.A., Andersen A.N., Silva R.R., Bishop T.R., Gómez C., Grossman B.F., Myusah K., Luke S.H., Pacheco R., Pearce-Duvel J., Retana J., Tista M. & Parr K. Habitat disturbance selects against both small and large body size across varying climates. *Ecography*.
- Rocha-Ortega M., **Arnan X.**, Favila M.E., Ribeiro-Neto J.D., Leal I.R. & Martínez-Ramos M. Taxonomic and functional ant diversity along a secondary successional gradient in a tropical forest: evidence for the niche complementarity hypothesis. *Biotropica*.
- Arnan X.**, Leal I.R., Tabarelli M., et al. A framework for deriving measures of chronic anthropogenic disturbance: surrogate, direct, single and multi-metric indices in Brazilian Caatinga. *Conservation Biology*.

- **Languages**

Catalan and Spanish: native speaker

English and Portuguese: good reading and comprehension skills, fair speaking and writing skills

- **R&D contracts and participation in funded projects**

- Competitive projects

Project title: Perturbações antrópicas crônicas, diversidade funcional de formigas e resiliência ecossistêmica frente a mudanças climáticas. Financial support: FACEPE APQ 06012.05/15. Participants: Universidade Federal de Pernambuco. Duration: 2015-2017. Amount awarded: 72,410 R\$. Leader: Dr. Xavier Arnan.

Project title: Chronic anthropogenic disturbance in the Caatinga: effects on ant-mediated ecosystem services and their vulnerability to climate change. Financial support: The Rufford Foundation, Rufford Small Grants Rufford Foundation. Participants: Universidade Federal de Pernambuco. Duration: 2015-2016. Amount awarded: 7,515.25 \$. Leader: Dr. Xavier Arnan.

Project title: Perturbações antrópicas e a transformação do ecossistema Caatinga: implicações para a sustentabilidade do semiárido. Financial support: PRONEX-FACEPE processo número APQ-0138-2.05/14. Participants: Universidade Federal de Pernambuco, Instituto Chico Mendes de Biodiversidade, Universidade Federal Rural de Pernambuco, Universidade Federal do Vale do São Francisco, Universidade Federal da Paraíba, Universidade Federal de Sergipe, Escola Superior de Agronomia Luís de Queiroz, University of Kaiserslautern, Universidade Nacional Autónoma de México, Commonwealth Scientific and Industrial Research Organization (CSIRO). Duration: 2015-2018. Amount awarded: 750,000 R\$. Leader: Dr. Marcelo Tabarelli. Participation: Researcher.

Project title: Perturbações antrópicas, mudanças climáticas e a biota futura da Caatinga. Financial support: Programa de Pesquisa Ecológica de Longa Duração – CNPq processo número 403770/2012-2. Participants: Universidade Federal de Pernambuco, Instituto Chico Mendes de Biodiversidade, Universidade Federal Rural de Pernambuco, Universidade Federal do Vale do São Francisco, Universidade Federal da Paraíba, Universidade Federal de Sergipe, Escola Superior de Agronomia Luís de Queiroz, University of Kaiserslautern, Universidad Nacional Autónoma de México, Commonwealth Scientific and Industrial Research Organization (CSIRO). Duration: 2013-2017. Amount awarded: 210,000 R\$. Leader: Dr. Marcelo Tabarelli. Participation: Researcher.

Project title: Fire effects on key insects diversity (ants and bees) in the Andalusian forests: functional aspects and conservation implications (RNM 2705). Financial support: Junta de Andalucía (Spanish Administration). Participants: Universidad de Granada, CSIC, CREAM. Duration: 2014 – 2016. Amount awarded: 163,000 €. Leader: Dr. Jorge Castro. Participation: Researcher.

Project title: Spatial heterogeneity in plant-pollinator communities: effects on interaction networks and consequences to pollination function (Spalink, CGL2013-41856-P). Financial support: Ministerio de Ciencia e Innovación (Spanish Administration). Participants: CREAM. Duration: 2014 – 2016. Amount awarded: 114,950 €. Leaders: Dr. Jordi Bosch & Dr. Anselm Rodrigo. Participation: External collaborator.

Project title: Spanish woodlands and global change: threats and opportunities (MONTES). Financial support: Consolider-Ingenio 2010 (Spanish Administration). Participants: CREAM, CTFC, EBD, ICTJA, UB, UCLM, UGR, CIEMAT, IRN-URJC. Duration: 2009-2013. Amount awarded: 4000,000 €. Leader: Dr. Javier Retana. Participation: Researcher.

Project title: Effects of habitat change and fragmentation on plant-pollinator communities: a landscape perspective from population to pollination network structure (CGL2009-12646). Financial support: Ministerio de Ciencia e Innovación (Spanish Administration). Participants: CREAM. Duration: 2010 – 2012. Amount awarded: 192,390 €. Leader: Dr. Jordi Bosch. Participation: Researcher.

Project title: Dendrocronological study of monumental and exceptional olive trees from Montsià mountains. Financial support: AGAUR (Catalan Administration, Spain). Participants: CREAM, Consell Comarcal del Montsià. Duration: 2008. Leader: Dr. Jordi Martínez-Vilalta. Participation: Research collaborator.

- Project title: REMEDE: Resource Equivalency Methods for Assessing Environmental Damage in the EU. EC Contract nº 022787. Financial support: European Commission. Participants: 15 partners from 8 EU Member States, Norway and the USA (including CREAM). Duration: 2005 – 2008. Leader: Ece Ozdemiroglu. Participation: Research collaborator.
- Project title: Importance of forest maturity degree on animal communities conservation. Application to Birds, Small mammals and Hymenoptera in the National Park of Aigüestortes i Estany de Sant Maurici. Financial support: Organismo Autónomo de Parques Nacionales, Ministerio de Medio Ambiente (Spanish Administration). Participants: CREAM. Duration: 2005 - 2007. Amount awarded: 43,067 €. Leader: Dr. Javier Retana. Participation: Research collaborator.
- Project title: Factors affecting variability in ant and plant communities after fire: Effect of interactions and post-fire dynamics. (InterPIAnt) REN2001-2500/GLO. Financial support: CYCIT (Spanish Administration). Participants: CREAM - Universitat Autònoma de Barcelona. Duration: 2002 - 2004. Amount awarded: 41,435 €. Leader: Dr. Anselm Rodrigo. Participation: PhD fellow.
- Project title: Land use changes and interactions with fire in the Mediterranean (LUCIFER). Financial support: European Community. Participants: CREAM - Universitat Autònoma de Barcelona, Universidad de Castilla La Mancha, CEAM, LTS (Perpignan), CNRS-CEFE (Montpellier), CNR-ICT (Pisa), DIP SAVA (Campobasso), Universidad de Trier, Algosystems (Kalithea), Universitat d'Atenes, ISA (Lisboa), ADAI (Portugal). Duration: 1997 - 2000. Amount awarded: 120,000 €. Leader: Dr. Jose Manuel Moreno (Universitat de Castilla La Mancha). Participation: Collaborator in practises.

No competitive projects

- Project title: Potential impact of commercial beekeeping on availability of floral resources and pollinating insect diversity in the Natural Park of Garraf (II). Financial support: Diputació de Barcelona (Catalan Administration, Spain). Participants: CREAM. Duration: 2011. Leader: Dr. Xavier Arnan.
- Project title: Potential impact of commercial beekeeping on availability of floral resources and pollinating insect diversity in the Natural Park of Garraf (I). Financial support: Diputació de Barcelona (Catalan Administration, Spain). Participants: CREAM. Duration: 2010. Leader: Dr. Anselm Rodrigo. Participation: Researcher.
- Project title: Ant species richness, diversity and behavioral dominance. Financial support: CSIRO. Participants: CSIRO. Duration: 2007-2009. Leader: Dr. Alan Andersen. Participation: Research collaborator.
- Project title: Design and demonstration of restoration and improvement techniques of mountain forests biodiversity: application to the forests surrounding the National Park of Aigüestortes i Estany de Sant Maurici. Financial support: Fundació La Caixa (Private Catalan Foundation). Participants: CREAM, Museum of Natural Sciences of Barcelona. Duration: 2006 - 2008. Leader: Lluís Comas. Participation: Research collaborator.
- Project title: Ants in old-growth forests: keystones for the conservation of mountain forests. Financial support: Fundació Territori i Paisatge (Private Catalan Foundation). Participants: CREAM, UAB. Duration: 2007. Leader: Dr. Javier Retana. Participation: Research collaborator.
- Project title: CASI-LIDAR Montseny 2007. Financial support: Diputació de Barcelona (Catalan Administration, Spain). Participants: CREAM, ICC. Duration: 2007. Leader: Joanjo Ibañez. Participation: Research collaborator.
- Project title: Handbook of evergreen oak forest management: use, exploitation and directives for forest management. Financial support: Diputació de Barcelona (Catalan Administration, Spain). Participants: CREAM. Duration: 2006 - 2010. Leader: Dr. Javier Retana. Participation: Research collaborator.
- Project title: Participation in various forestry studies in the Barcelona Province. Financial support: Oficina Tècnica de Prevenció d'Incendis, Diputació de Barcelona (Catalan Administration, Spain). Participants: CREAM. Duration: 2006-2007. Leader: Dr. Josep Maria Espelta. Participation: Research collaborator.
- Project title: Improvement of fire risk maps. Financial support: Departament de Medi Ambient i Habitatge, Generalitat de Catalunya (Catalan Administration, Spain). Participants: CREAM. Duration: 2003 – 2008. Leader: Jose Àngel Burriel. Participation: Research collaborator.

- **Research stays abroad**

- Topic: The effects of increasing human disturbance on ant-mediated ecosystem services and ecosystem resilience to climate change. Center: Universidade Federal de Pernambuco. Place: Recife, Brazil. Date: 2016-2017.
- Topic: Effects of increasing human disturbance and reduction in rainfall on ant communities and their interactions with plants. Center: Universidade Federal de Pernambuco. Place: Recife, Brazil. Date: 2014-2016.
- Topic: Functional redundancy and response diversity patterns of Mediterranean ant communities along a vegetation gradient. Center: Technische Universität Darmstadt. Place: Darmstadt, Germany. Date: 2012-2013 (20 months)
- Topic: Study on co-occurrence of multiple species in the ant genus *Monomorium*. Center: CSIRO (Australian Commonwealth Scientific and Research Organization). Place: Darwin, Australia. Date: 2009 (10 weeks).
- Topic: Study on dominance and species co-occurrence in highly diverse ant communities. Center: CSIRO (Australian Commonwealth Scientific and Research Organization). Place: Darwin, Australia. Date: 2008 (16 weeks).

- **Attendances to congresses and conferences**

- Bosch J., Kemp W. P., Sgolastra F., Pitts-Singer T., **Arnan X.**, Maini S. (2016) Pre-wintering conditions and post-winter performance in a solitary bee. Oral presentation in the XXV International Congress of Entomology. September 25-30, Orlando, Florida.
- Arnan X.** (2016) Ant responses and adaptations to global change. Conference in the Forum of Ecology and Evolution at the Universidade Federal de Pernambuco. September 28, Recife, Brazil.
- Leal I.R., Leal L., Oliveira F.P., Câmara T., **Arnan X.**, Andersen A. (2016) Anthropogenic disturbance and climate change reduce seed dispersal and anti-herbivore protection services provided by ants to plants. Oral presentation at the Annual Meeting of the Association for Tropical Biology and Conservation (ATBC), June 19-23, Montpellier, France.
- Arnan X.**, Arcoverde G.B., da Silva C.H.F., Leal I.R. (2015) The impacts of chronic anthropogenic disturbance and climate change on ant communities in seasonally dry tropical forests. Oral presentation (invited speaker) at the XXII Simpósio de Mirmecologia, An International Ant Meeting, October 18-22, Ilhéus, Brazil.
- Arnan X.**, Blüthgen N. (2015) Ecosystem resilience in Mediterranean ant communities: functional redundancy and response diversity along vegetation gradients. Oral presentation (invited speaker) at the XXII Simpósio de Mirmecologia, An International Ant Meeting, October 18-22, Ilhéus, Brazil.
- Lima Jr F.C., Dias M.R.P., Zorger B.B., Flores A.P., Martins C.S.G., Oliveira F.M.P., **Arnan X.** (2015) Thermal responses of arboreal and terrestrial ants in the Caatinga. Oral presentation at the XXII Simpósio de Mirmecologia, An International Ant Meeting, October 18-22, Ilhéus, Brazil.
- Leal I.R., Filgueiras B.K.C., **Arnan X.**, Ribeiro-Neto J.D. (2015) Erosion in functional diversity of insect communities in Atlantic forest fragments. Oral presentation in VII Congreso de Ecología de Mexico, April, San Luis Potosí, Mexico.
- Cerdá X., Retana J., **Arnan X.**, Angulo E., Boulay R. (2014) Global life trait spectra of resource exploitation in European ants. Oral presentation at the 17th Congress of the International Union for the Study of Social Insects (IUSSI), July 13-18, Cairns, Australia.
- Quevedo L., Rodrigo A. & **Arnan X.** (2013) Mejora de la estructura del monte bajo de *Arbutus unedo*, por efecto de talas post incendio. Oral presentation at the VI Congreso Forestal Español, June 10-14. Vitoria, Spain.
- Arnan X.**, Escolà A., Rodrigo A. & Bosch J. (2013) Female reproductive success in gynodioecious *Thymus vulgaris*: pollinator foraging behaviour and pollen versus nutrient limitation. Oral presentation at the XI Congreso Nacional de la AEET (Asociación Española de EcologíaTerrestre), May 6-10. Pamplona, Spain.
- Osorio S., **Arnan X.**, Vicens N., Bassols E. & Bosch J. (2013) Structure of a bee-wasp community and its parasitoid interaction network along an agricultural-forest gradient. Poster presentation at the XI Congreso Nacional de la AEET (Asociación Española de EcologíaTerrestre), May 6-10. Pamplona, Spain.

- Torné-Noguera A., Rodrigo A., **Arnan X.**, Osorio S., Barril-Graells H., Correia L. & Bosch J. (2013) Collateral effects of beekeeping: impacts on floral resources and wild bee communities. Poster presentation at the XI Congreso Nacional de la AEET (Asociación Española de Ecología Terrestre), May 6-10. Pamplona, Spain.
- Arnan X.**, Molowny-Horas R., Rodrigo A. & Retana J. (2011) Modelling dual interactions between species: the case of ants and seeds. Poster presentation at the 12th European Ecological Federation (EEF) Congress, September 25-29. Avila, Spain.
- Pearce-Duvel J., **Arnan X.**, Rodrigo A., Boulay R. & Cerdá X. (2011) The effect of fire on resource discovery in Mediterranean ant communities. Oral presentation at the Ecological Society of America (ESA) Congress, August 7-12. Austin, USA.
- Pearce-Duvel J., **Arnan X.**, Rodrigo A., Boulay R. & Cerdá X. (2011) The effect of fire on resource discovery in a Mediterranean ant community. Poster presentation at the Union Internationale pour l'Étude des Insectes Sociaux (UIEIS), April 13-15. Banyuls-sur-mer, France.
- Cerdá X., **Arnan X.** & Retana J. (2011) Hormigas ecológicamente dominantes y subordinadas en comunidades mediterráneas. Oral presentation at the VI Congreso Ibérico de Mirmecología (Taxomara), June 29-30, 1 July. Girona, Spain.
- Arnan X.**, Ferrandiz-Rovira C., Pladevall C. & Rodrigo A. (2011) Partición de tareas asociada al tamaño de las obreras en la estrategia de forrajeo de una especie de hormiga granívora. Oral presentation at the VI Congreso Ibérico de Mirmecología (Taxomara), June 29-30, 1 July. Girona, Spain.
- Andersen A.N., **Arnan X.** & Sparks K. (2010) Not enough niches to explain a remarkable co-occurrence of congeneric ant species. Oral presentation at the Ecological Society of Australia (ESA)'s 50th Anniversary Conference, December 6-10. Canberra, Australia.
- Comas L., **Arnan X.**, Gracia M., Retana J. & Bosch J. (2009) Importancia del grado de madurez del bosque sobre las comunidades de himenópteros voladores y micromamíferos en el Parque Nacional de Aigüestortes i Estany de Sant Maurici. Poster presentation at the 5º Congreso Forestal Español, September 21-25. Avila, Spain.
- Andersen A.N. & **Arnan X.** (2008) Dominance and species co-occurrence in diverse ant communities: a test of the interstitial hypothesis. Oral presentation at the 33rd Ecological Society of Australia (ESA) Annual Conference. December 1-5. Sydney, Australia.
- Meghelli N., **Arnan X.**, Retana J., Comas L. & Boet O. (2008) Les communautés de Fourmis en forêts de montagne soumises à différents types de gestion. Oral presentation at the Congrès International sur la Biodiversité des Invertébrés en milieux Agricoles et Forestiers, April 14-17. El Harrach, Algeria.
- Arnan X.**, Rodrigo A. & Retana J. (2006) Influència del tipus de vegetació i la sequera en la regeneració postincendi de les comunitats de plantes mediterrànies. Oral presentation at the II Jornades d'Incendis Forestals i Recerca, November 9. Girona, Spain.
- Arnan X.**, Rodrigo A. & Retana J. (2006) Gradientes de vegetación y sequía condicionan la recuperación post-incendio de las comunidades de plantas y hormigas mediterráneas. Oral presentation at the II Congreso Ibérico de Ecología, organized by the Asociación Española de Ecología Terrestre (AEET) and the Sociedad Portuguesa de Ecología (SPECO), July 18-21. Lisboa, Portugal.
- Arnan X.**, Rodrigo A. & Retana J. (2003) Recuperación de las comunidades de hormigas en tres tipos de bosque diferentes después de un gran incendio. Poster presentation at the VII Congreso Nacional organized by the Asociación Española de Ecología Terrestre (AEET). July, 2-4. Bellaterra, Spain.

- **Supervision of postgraduate research projects**

- 2014-Ongoing. "Effects of climate change and human disturbance on the interactions between extrafloral nectar-bearing plants and ants in the Caatinga". Ph. D. Universidade Federal de Pernambuco. Student: Talita Câmara dos Santos Bezerra. Supervisor together with Dr. Inara Leal (Federal University of Pernambuco).
- 2010-Ongoing. "Spatial variability of the interactions between plants and pollinators". Ph. D. Autonomous University of Barcelona (Spain). Student: Sergio Osorio Cañadas. Supervisor together with Dr. J. Bosch (CREAF).

2016. "Effects of chronic anthropogenic disturbance and precipitation levels in plant-insect herbivore interactions in the Caatinga". Master degree thesis. Universidade Federal de Pernambuco. Student: Pedro Elias Neto. Supervisor together with Dr. Inara Leal (Federal University of Pernambuco).
2014. "Forests of *Arbutus unedo* L.: occurrence increase due to fire regime and the effects of post-fire forest-management on its growth, reproduction and associated fauna". Ph. D. Autonomous University of Barcelona (Spain). Student: Lúdia Quevedo Dalmau. Supervisor together with Dr. A. Rodrigo (Autonomous University of Barcelona).
2011. "Immediate responses to fire in the foraging activity of Mediterranean ant species *Aphaenogaster gibbosa*". Master degree thesis. Autonomous University of Barcelona (Spain). Student: Alba Lázaro-González. Supervisor together with Dr. A. Rodrigo (Autonomous University of Barcelona).

- **Teaching experience**

I started teaching during my Ph.D., when I co-taught some courses for the UAB's Ecology Unit (Barcelona, Spain). In 2007, I worked as an associate professor for half a year. One of my previous postdoctoral positions at the UAB (2009-2011) also involved teaching duties in the Ecology Unit, where I taught courses in three different degree programs (Biology, Environmental Biology and Environmental Sciences) and was an instructor for undergraduate laboratory and lecture courses. In my postdoctoral position at the UFPE (Brazil) I performed teaching duties in the Post-graduate program in Vegetal Biology of the UFPE. Over the course of my career, I have accumulated more than 550 teaching hours. Because of the quality of my teaching and research, I became an accredited Lecturer (in May 2010) and accredited Associate professor (in March 2016) (status granted by the Spanish ANECA - Agencia Nacional de Evaluación de la Calidad y Acreditación).

- **Grants and other fellowship received**

- Post-doctoral Research Grant (PDS). Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq (Brazil). Duration: 12 months. 2016-2017.
- Post-doctoral Research Grant (PDS). Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq (Brazil). Duration: 24 months. 2014-2016.
- Post-doctoral Research Grant for a sojourn in Germany. Spanish Ministry of Education. Duration: 20 months. 2012-2013.
- Post-doctoral Research Grant (I3). Autonomous University of Barcelona. Duration: 36 months. 2008-2011.
- Post-doctoral Research Grant for a sojourn in Australia (BE). Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR), Generalitat de Catalunya (Catalan Administration, Spain). Duration: 4 months. 2008.
- Ph.D. Scholarship. Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR), Generalitat de Catalunya (Catalan Administration, Spain). Duration: 4 years. 2002-2005.
- Collaboration fellowship. Spanish Ministry of Education and Science. Duration: 6 months. Academic course 2000-2001.

- **Other academic and/or professional credits/recognitions**

- Relevant courses: "Generalized Linear Models in Ecology" (using R) (2010, Barcelona, Spain), "Mixed models in R" (2011, Barcelona, Spain), "The use of biological traits in ecology" (using R) (2011, Lisboa, Portugal).
- Accreditation of Lecturer, obtained on 19 May 2010 and granted by ANECA (Agencia Nacional de Evaluación de la Calidad y Acreditación).
- Accreditation of Associate Professor, obtained on 16 March 2016 and granted by ANECA (Agencia Nacional de Evaluación de la Calidad y Acreditación).
- Research accreditation, obtained on 18 March 2016 and granted by AQU (Agència per a la Qualitat del Sistema Universitari de Catalunya).
- FDES certificate (accreditation program in Teacher Education in Higher Education), obtained on 2012 and granted by the Autonomous University of Barcelona.

I am also involved with the “Global Ant Database”

(<http://www.antmacroecology.org/collaboration.html>), a collaborative project involving more than 30 researchers, which aims to improve understandings of global patterns of ant diversity and occurrence.

Reviewer. Regular reviewer of the following journals: Journal of Vegetation Science, Journal of Animal Ecology, Insect Conservation and Diversity, Entomologia Experimentalis et Applicata, Biotropica, Annales Zoologici Fennici, Oecologia, Landscape Ecology, Ecography, Journal of Arid Environments, Functional Ecology, Ecological Entomology, PLoS ONE, Biodiversity and Conservation, Oikos, Community Ecology, Biological Conservation, Journal of Applied Ecology, Sociobiology, Animal Behaviour, Forest Ecology and Management, Diversity and Distributions, Insectes Sociaux, Myrmecological News, Journal of Insect Behaviour, Austral Ecology, Biotropica, Scientific Reports.

Professional affiliations: Asociación Española de Ecología Terrestre (AEET), Asociación Ibérica de Mirmecología (AIM), Association for Tropical Biology and Conservation (ATBC)