

SHORT CV Josep Peñuelas

Prof. Josep Peñuelas is a **Research Professor of the National Research Council of Spain (CSIC)** and **CREAF** (Center for Ecological Research and Forestry Applications).

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Prof Peñuelas is **highly cited** scientist in **ecology/environment, in plant and animal sciences, agricultural sciences, geosciences** and in **all science fields of the ISI essential science indicators (H-Index is currently 115 GS, i10 index: 566, and his works have received more than 63.500 citations GS).**

Prof. Peñuelas is one of the most respected and influential ecologists working today; no one working in global ecology can afford not to engage with his work. Professor Josep Penuelas is internationally recognized for his pioneering work on the discovery of ecophysiological mechanisms linked to the carbon and oxygen use that help to explain the diversity and distribution of aquatic and terrestrial plants; the development of increasingly used remote sensing techniques to assess plant and ecosystem functioning (e.g. he codeveloped the PRI, photochemical reflectance index, and developed the WBI, water band index, that are becoming established tools in remote sensing); the discovery of current evidences of global change, climate change, and air pollution effects on biodiversity and structure and functioning of terrestrial ecosystems; the introduction of metabolomics in ecology, the study of the mechanisms and the function and effects of volatile organic compounds emissions by plants and ecosystems, the disentangling of biogeochemical processes involved in the carbon and nutrient cycles, or the development of science and policy for a sustainable planet, among many others. This work led to a critical understanding of how environment and ecology are centrally important in managing the global environmental crisis. He has coordinated groups of international scientists in the production of a series of influential papers on Ecology, Earth sciences, and the influences that human activities have on the biosphere. He also has an international reputation in other, diverse fields, such as molecular Ecology, theoretical Ecology, agriculture, food security, global human health, or the role of humans in precipitating global change and existential crisis during the Anthropocene. This expertise is reflected in the number of Keynote and Plenary invitations and the Prizes and Awards he receives every year.

Recent issues of study:

His research in the field of global ecology tackles with scientific challenges that require high levels of interdisciplinarity.

His fields of specialization are: Global ecology, global change, climate change, atmospheric pollution, Biogenic Volatile Organic Compounds emissions, remote sensing, plant ecophysiology, functioning and structure of terrestrial plants and ecosystems, chemical ecology, ecometabolomics, microbial ecology, macroecology, biogeochemistry with special focus on phosphorus, environmental sustainability, food security..

Scientific publications:

Professor J. Peñuelas has published **6 books on ecology**, more than **1000 papers in scientific journals and books** (more than 600 in journals of the Science Citation Index; 55 in **Nature** journals, 5 in **Science**, 9 in **PNAS**, 17 in **Trends in Plant Science**, 7 in **Trends in Ecology and Evolution**, 1 eLife, as well as in **highest profile scientific journals** in ecology and environmental sciences: 44 in **Global Change Biology**, 17 in **Global Ecology and Biogeography**, 5 in **Ecology Letters**; remote sensing: 14 in **Remote Sensing of Environment**; and plant biology: 31 in **New Phytologist**), 300 in other journals and chapters of books, and more than **270 articles on popular science** in Catalan and Spanish newspapers (La Vanguardia, Avui, El País, El Temps...). It is also outstanding his labour popularizing science issues at international and national scale. He is also generating several influencing studies to develop science and policy for a sustainable planet, including use and recycling of resources, food security, and mitigation of pollution and climate change.

Relevant milestones and summary of the scientific activity and production records:

Some of the most outstanding results of Prof. Peñuelas' research include: the discovery of ecophysiological mechanisms linked to the carbon and oxygen use that help to explain the diversity and distribution of aquatic and terrestrial plants and ecosystem functioning; the development of increasingly used remote sensing techniques to assess plant and ecosystem functioning (e.g. he co-developed the PRI, photochemical reflectance index, or the WI Water Index, that are becoming established tools in remote sensing); the discovery of current evidences of global change, climate change, and air pollution effects on biodiversity and structure and functioning of terrestrial ecosystems; the disentangling of biogeochemical processes involved in the carbon and nutrient cycles; the report of phenology as a crucial factor in biosphere and Earth functioning; function and ecological and environmental effects of Volatile Organic Compounds by plants and ecosystems; the introduction of metabolomics in field ecology; the plant interactions with microbes and animals in biogeochemical cycles; the impacts of global change in fertilizers and food security, as well as the development of policies for environmental protection and sustainable development.

Stages, teaching activities and invited seminars in international centers

Prof. Peñuelas was Titular Professor of Ecology in the University of Barcelona until 1990 and is involved on seminars and postgraduate courses in many of the main national and international Universities. He has been visiting professor or visiting scientist in more than 50 universities and centers in all the continents, including for example, universities of Barcelona, Los Angeles, Washington, Duke, Lancaster, Avignon, Paris, Saint Andrews, Mexico, Tokyo, Sheffield, National Center for Atmospheric Research (Boulder Colorado), Phoenix, Flagstaff, Vancouver, Boulder, Hawaii at Moana, Mèxic, Danah Latu (Borneo), Australian National University (Canberra), Stanford, Colorado, Kuopio, British Columbia, Maryland, Católica de Chile, Northern Arizona, Tsukuba (Japan), Malaysia Sabah, Stanford, Lancaster, China Academy of Sciences, Macquarie University, NCAR Boulder Beijing, ASU Phoenix, NAU Flagstaff, Berkeley, Stanford, Oxford, Cambridge, PNNL Richland (Washington), Antwerp University, University of Zurich, Talahua-Simiatug (Bolivar-Ecuador), Berkeley, Stanford, Cambridge, Oxford, Brno, Vienna, Birmingham, Center of Molecular Plant Biology University of Delhi,..... He is involved on seminars and postgraduate courses in many of the main national and international Universities.

National and International recognition: scientific prizes/awards:

- Elected one of the 45 outstanding Spanish scientists in "La generación de la ley de la Ciencia. 45 perfiles de científicos de hoy" by the Spanish Ministry of Science and Technology. 2005.
- Organizer and signer of the Barcelona Declaration 2008: Challenges and Pathways to Earth Sustainability. 2008.
- Prizes (**Omnium cultural** 1975; **Omnium cultural** 1976; **Comte de Barcelona** 1990; **NASA** 1993; **Japan Ministry of Science** 1998; **Premi Medi Ambient Institut Estudis Catalans i Obra Social Caixa de Sabadell** 2008; **National Research Prize of Catalonia** 2010; **ERC-Synergy** 2013; **silver badge of the Institut d'Estudis Catalans** 2014; **Premio Rey Jaime I** 2015; **Doctor Honoris Causa by the Estonian University of Life Sciences**, Tartu, Estonia 2016; **adoptive son of Figueres** 2016; **Ramon Margalef's Prize in Ecology** 2016; **Chair of the panel of judges for the Nature's awards for scientific mentoring** 2017; **Chinese Academy of Sciences Distinguished Scientist** 2018; **Special mention at the Premis Ciutat de Barcelona 2017 in the class of Earth and environmental sciences** (February, 2018), **Marsh Award for Climate Change Research, British Ecological Society** (2018), **IV Excellence Prize Ramon Muntaner** 2018, **Prize city of Barcelona 2018 in the class of Earth and environmental sciences** (February, 2019),

Science management and editorial activities:

- He has been principal investigator or scientific coordinator of several European Union, Spanish and Catalan projects financed by public research agencies and by private funding. Among them he has been awarded recently with ERC-Synergy 2014-2019 grant.
- Supervision of young researchers: 44 PhD theses, 46 Master theses, 47 postdocs.
- He is currently member of the editorial board of the most influential scientific journals in ecology, global ecology, plant and animal sciences, atmospheric sciences and remote sensing as *Ecology Letters* (since 2004), *Global Change Biology* (since 2010), *Global Ecology and Biogeography* (since 2010), *Trends in Plant Science* (since 2016), *New Phytologist* (since 2008), *Remote Sensing of the Environment* (since 2004), *Atmospheric Pollution Research* (since 2009), *e-Forestry* (since 2007), *Journal of Plant Ecology* (2008 - 2011), *Plant Ecology*

and *Diversity* (since 2007), *Trees structure and function* (since 2013), *Contributions to Science* (since 2014) and *Sensors* (since 2016). He collaborates in the reviewing of articles in many scientific journals, some of them of great prestige such as *Science*, *Nature*, *Nature Geoscience*, *Nature Climate Change*, *Proceedings of National Academy of Sciences (USA)*, *Trends in Ecology and Evolution*, *Biologia...*.

- Scientific **advisor** of several international research centers, foundations, city councils, governments, and diverse associations... and diverse cultural activities associated to science and the dissemination of science. Member of the **Steering committee** of several European research consortia (CLIMMANI, VOCBAS, COST-TERRABITES,...).

- Member of several academies and international and national scientific associations.

Policy activities in environment and sustainability:

Ex-President of Institució Catalana d'Història Natural, and Ex-Advisor of the Council for Sustainable Development of Catalunya (CADS) Catalan Government. Member of the Consell Assessor Científic of the Ajuntament de Barcelona (since 2019).

Funding last 10 years:

Principal investigator (PI) or partner in 24 national and international research projects (mainly public and EU-funded): CLIMOOR, VULCAN, ALARM, ISONET, VOCBAS, NITROEUROPE, MICROCARB, CONSOLIDER-MONTES, GLOVOCS ...

Current funding:

Since 2014 the group is funded by European Research, **ERC_Synergy**, Spanish and Catalan national science agencies. Also additional funding from European foundations and institutions (AIR-Liquide,...), and Spanish institutions and foundations (BBVA, CSIC...).

Multiple invited presentations and lectures, research expeditions, and organization of international conferences