

# Antonio Aguilar-Garrido

Environmental Scientist. PhD student

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## About me

Antonio Aguilar-Garrido is a PhD student in the field of soil science. He holds a degree in Environmental Sciences and a master's degree in Conservation, Management and Restoration of Biodiversity, both from the University of Granada. Currently, he is pursuing a PhD in Earth Sciences at the [Department of Soil Science and Agricultural Chemistry](#) of the [University of Granada](#) under the supervision of Professor F. J. Martín Peinado ([fjmartin@ugr.es](mailto:fjmartin@ugr.es)), for which he received the Spanish government FPU research grant. During his PhD he carried out a short research stay at the [Linking Landscape, Environment, Agriculture and Food \(LEAF\)](#) research centre of the [Instituto Superior de Agronomía](#) in the [University of Lisbon](#) (Portugal). His research focuses on the generation of Technosols from urban, agricultural and mining wastes for the treatment of water and soils polluted by potentially harmful elements (PHEs) (e.g., As, Cu, Pb and Zn). His main interests are related to the fields of soil and water contamination/decontamination, mining restoration, toxicity assessment and circular economy. He has worked with the main analyses of soil properties, enzyme activities in soils and toxicological bioassays to evaluate the toxicity on soils of different PHEs. Furthermore, he has teaching experience in the subjects of "The physical environment", "Soil science", "Methods for the study of the natural environment" and "Soil evaluation, management, conservation, and recovery techniques" of the degrees in Biology and Environmental Sciences; and has mentored some final degree/master's degree projects. He has been involved in the Spanish Ministry of Science research project "Restoration of soils contaminated by heavy metals: A strategy based on waste revalorisation and bioremediation (RTI 2018-094327-B-I00)". Aguilar-Garrido is the first author of five academic articles, and co-author of four others, which have all been published in JCR-indexed journals. He is also author of six book chapters and has presented several posters and oral communications in conferences at national and international level. He has also collaborated as a reviewer in prestigious JCR-indexed journals such as *Science of the Total Environment*, *Environmental Geochemistry and Health*, and *Plant and Soil*.

**Research topics:** Soil Science, Environmental Sciences, Water, Contamination, Ecotoxicology, Potentially harmful elements (PHEs), Waste valorisation, Technosols, Toxicity assessment.

## Personal data

Nationality: Spanish

Date and place of birth: 28/07/1995. Alfacar, Granada, Spain.

Current working position: Predoctoral Fellow / PhD student

Workplace: Department of Soil Science and Agricultural Chemistry. Faculty of Sciences. University of Granada. Spain.



## Education

### PhD in Earth Sciences.

Oct 2019 - Present

Department of Soil Science and Agricultural Chemistry. Faculty of Sciences. University of Granada. Spain.

### Master of Science in Conservation, Management and Restoration of Biodiversity.

Oct 2018 - Jul 2019

Faculty of Sciences. University of Granada. Spain.

### Degree in Environmental Sciences.

Sep 2013 - Jan 2018

Faculty of Sciences. University of Granada. Spain.

## Experience

### Predoctoral Fellow.

Oct 2019 - Oct 2023

Department of Soil Science and Agricultural Chemistry. Faculty of Sciences. University of Granada. Spain.

**PhD Short Stay.**

Sep 2021 - Dec 2021

Research centre LEAF - Linking Landscape, Environment, Agriculture and Food. Instituto Superior de Agronomia. Universidade de Lisboa. Portugal.

**Trainee researcher.**

May 2019 - Jul 2019

Food Chain Economics Area. Andalusian Institute for Research and Training in Agriculture, Fisheries, Food and Ecological Production (IFAPA). Junta de Andalucía. Granada. Spain.

**Internal student.**

Nov 2016 - Sep 2019

Department of Soil Science and Agricultural Chemistry. Faculty of Sciences. University of Granada. Spain.

## Teaching activity

### Formal teaching

[Department of Soil Science and Agricultural Chemistry. University of Granada. Spain.](#)

**Soil Science.** Degree in Environmental Sciences (2° course)

20 hours (Academic year 2019/2020), 20 hours (Academic year 2020/2021), 60 hours (Academic year 2021/2022).

**Soil evaluation, management, conservation, and recovery techniques.** Degree in Environmental Sciences (3° course)

8 hours (Academic year 2019/2020), 8 hours (Academic year 2020/2021).

**The physical environment.** Degree in Biology (1° course)

25 hours (Academic year 2019/2020), 25 hours (Academic year 2020/2021).

**Methods for the study of the natural environment.** Degree in Biology (1° course)

7 hours (Academic year 2019/2020), 7 hours (Academic year 2020/2021).

### Talks and courses

**Talk. Aplicación de Tecnosoles derivados de residuos para el tratamiento de suelos y aguas afectados por minería.** Feb 2021

Master' Degree in Conservation, Management and Restoration of Biodiversity. University of Granada.

Seminar given in the context of the subject "Soil Restoration" focused on the generation of Technosols from organic/inorganic waste for application in soil remediation and water treatment affected by PHEs (As, Pb, Sb, and Zn).

### Supervision of student research (final degree/master's degree projects)

#### Mentoring

[Department of Soil Science and Agricultural Chemistry. University of Granada. Spain.](#)

**Contribución de las áreas mineras recuperadas con Tecnosoles como sumideros de C.** 2023-2024 (In process)

Master's degree in Conservation, Management and Restoration of Biodiversity.

**Evaluación de fitoextracción de elementos tecnológicamente críticos.** 2022-2023

Master's degree in Conservation, Management and Restoration of Biodiversity. Mark: 9 (Defense: 20/09/2023)

**Evaluación de Tecnosoles en la descontaminación de suelos y su influencia sobre la fitotoxicidad de metales pesados.** 2022-2023

Master's degree in Advances in Agricultural Biology and Aquaculture. Mark: 9.9 (Defense: 20/07/2023)

**Uso de Tecnosoles en la recuperación de suelos contaminados por actividades mineras.** 2021-2022

Master's degree in Conservation, Management and Restoration of Biodiversity. Mark: 9.7 (Defense: 20/07/2022).

**Aplicación de Tecnosoles para la recuperación de suelos contaminados.** 2020-2021

Master's degree of Advances in Agricultural Biology and Aquaculture. Mark: 9.0 (Defense: 20/09/2021).

## Grants and awards

- Roland Schlich Travel Support of the European Geosciences Union 2022, 2023.** May 2022, Apr 2023  
Awarded by the European Geosciences Union (EGU).
- Mobility grant FPU.** Mobility grant of the University Teacher Training Program. Sep 2021 - Dec 2021  
Granted by the Spanish Ministry of Science, Innovation and Universities.
- FPU.** Formación de Profesorado Universitario contract. Oct 2019 - Present  
Granted by the Spanish Ministry of Science, Innovation and Universities.
- End-of-degree Award in Environmental Sciences.** Academic year 2017/2018. Nov 2019  
Granted by the University of Granada (Spain).
- Collaboration grant of the XXXII Reunión Nacional De Suelos.** Funding on-site participation. Sep 2019  
Awarded by the Spanish Society of Soil Sciences (SECS).
- Best Final Degree Project Award in Environmental Sciences of Andalusia of 2017.** Jun 2018  
Granted by the Professional Association of Graduates in Environmental Sciences of Andalusia (COAMBA).
- Collaboration grant in university departments.** Oct 2016 - Jul 2017  
Granted by the Spanish Ministry of Education, Culture and Sport.

## Research projects

- Restauración de suelos contaminados por metales pesados: Una estrategia basada en la revalorización de residuos y la biorremediación (RTI 2018-094327-B-I00).** 2019-2021  
Spanish national project (Call 2018 for R+D+i projects "Research challenges", of the State R+D+i program oriented to societal challenges). Funded by the Spanish Ministry of Science, Innovation and Universities.

## Scientific - Technical experience

### [Methodologies and scientific instruments](#)

#### **Soil sampling and interpretation in the field.**

- ☞ Sampling of agricultural and forest soils, and soils polluted by metal(loid)s (e.g., As, Cd, Cu, Sb, Pb, Zn).
- ☞ Description of soil profiles (landscape, soil components, soil-forming factors, pedogenic processes, pedogenic features, etc.) according to the Guide for the description of soil profiles (FAO, 2009).
- ☞ Classification of soils according to the global reference base of the soil resource 2014, Update 2015 (Working Group IUSS WRB, 2015).
- ☞ Soil monoliths sampling for museum displays.

#### **Soil chemistry.**

- ☞ Analysis of physical, chemical and physicochemical soil properties according to official analysis methods of the Spanish Ministry of Agriculture, Fishing and Food (1986).
- ☞ Enzyme activity in soils: dehydrogenase (Tabatabai, 1994), urease (Kandeler and Gerber, 1988), acid phosphatase (Eivazi and Tabatabai, 1977), cellulase (Hope & Burns, 1987), protease (Ladd & Butler, 1972), sulfatase (Tabatabai, 1994; Dick et al., 1996), and  $\beta$ -glucosidase (Eivazi and Tabatabai, 1988).

#### **Analytical chemistry.**

- ☞ Elemental analysis by ion chromatography (Dionex DX-120 chromatograph).
- ☞ Determination of the concentration of trace elements and heavy metals/metalloids by X-ray fluorescence (NITON XLt 792 XRF analyser).
- ☞ Acid digestion for vegetable and soil samples by combined pressure-temperature (Microwave XP1500 Plus) or temperature (Sample Preparation Block Perkin Elmer) method.

- ☞ Analysis of trace elements and metal(loid)s in soils and plants by inductively coupled plasma optical emission spectroscopy (ICP-OES Avio® 500, Perkin Elmer) and atomic absorption spectrometry (SpectrAA 220FS Varian).

### **Ecotoxicology.**

- ☞ Toxicological bioassays for the evaluation of environmental risks.
  - \* Seed germination/root elongation of *Lactuca sativa* L. (OECD, 2003; US EPA, 1996).
  - \* Soil carbon transformation rate: Measurement of the basal and induced heterotrophic respiration by a microbiological analyser-trac 4200 SY-LAB® (ISO 17155, 2002), the microbial biomass using the irradiation/incubation method (Ferreira et al., 1999) and the metabolic quotient (Anderson and Domsch, 1993).
  - \* Microcosms assays with different plant species (*Trifolium pratense* L., *Hordeum vulgare* L., ...): filter paper test (Salvatore et al., 2008), hydroponic test (Santos et al., 2013), and soil test (ISO 15799, 1999; Martí et al., 2007).
  - \* Survival and bioaccumulation of potentially harmful elements in *Eisenia andrei* (OECD, 1984; OECD, 2010).

## **Computer skills**

**Desktop publishing:** Microsoft Office, LibreOffice, Google Docs, LaTeX (Overleaf), BibTeX, InkScape, Adobe Photoshop, IrfanView.

**Programming languages:** Python, R.

**Statistical software:** SPSS, R Studio, R Commander, SigmaPlot, ETX, PRIMER.

**Geographic information systems (SIGs):** ArcGIS, QGIS.

**Others:** Git, Turnitin, Mendeley, Zotero.

## **Languages**

Mother tongue: **Spanish**, Intermediate-Fluent (B2): **English**, Basic (B1): **Portuguese**

## **Publications**

11 peer-reviewed Journal papers (9 in JCR), 6 book chapters and 12 publications in peer-reviewed conferences. 5 articles reviewed.