

Part A. PERSONAL INFORMATION		CV date	31/01/2024
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### A.1. Current position

Position	Marie Skłodowska-Curie Actions Postdoctoral Fellow		
Initial date	15/05/2023		
Institution	BC3 Basque Centre for Climate Change - Klima Aldaketa Ikergai		
Department/Center	Terrestrial Ecosystems		
Country	Spain	Teleph. number	+34 641574990
Key words	Soil Resources; Soil change; Forestry; Anthropogenic impact on ecosystems; Terrestrial ecosystem; Climate change; Soil type; Digital Soil Mapping; Soil Organic Carbon; Soil security		

### A.2. Previous positions (research activity interruptions, see call)

Period	Position/Institution/Country/Interruption cause
16/09/2019 – 31/03/2023 <b>42.5 months</b>	Postdoctoral Research Associate on Digital Soil Mapping / The University of Sydney / Sydney, Australia / Starting MSCA-PF
01/11/2014 – 31/10/2018 <b>48 months</b>	Postdoctoral researcher/ French National Research Institute for Agriculture, Food and Environment (INRAE)/ Orleans, France/ Fixed term contract.
04/01/2011 – 08/08/2014 <b>44 months</b>	Graduate Research Assistant/ Utah State University (USU)/ Logan, UT, USA / Finished doctorate.
01/10/2009 – 31/12/2010 <b>15 months</b>	Undergraduate Research Assistant/ Polytechnic University of Madrid (UPM)/ Madrid, Spain/ Starting doctorate in USA.
01/11/2008 – 30/04/2009 <b>6 months</b>	Technician/ Center for Energy, Technological and Environmental Research (CIEMAT)/ Madrid, Spain/ Undergraduate scholarship.

### A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD Ecology	Utah State University (United States)	2014
Forestry Engineering	Universidad Politécnica de Madrid (Spain)	2010

## Part B. CV SUMMARY

I was awarded a **Marie Skłodowska-Curie Actions European Postdoctoral Fellowship (MSCA-PF)** as **PI** of the project **SELVANS “Soil condition and capability mapping for sustainable forest management”** (15/05/2023-15/05/2025) (**181,152.96 €**). As a researcher of the Ecology and Ecosystem Conservation (ECO2) group at the Basque Centre for Climate Change BC3, I aim to provide forest managers and policy-makers with tools to assess the effects of management intensity on soil condition and carry soil condition assessment within the soil security framework. In a secondment with CEREGE (Marseille, France) we are investigating the relationship between patterns in land use history and climate with soil change at national scale. I’m a member of the **Soil Security Think Tank** hosted by the University of Sydney (USyd), where I made profound contributions to the conceptual development of soil security, designed a digital soil mapping (DSM) framework for stratifying the soil landscape and studying soil change based on a new concept, the *pedogenon*. Pedogenon maps were used by consulting companies for optimizing soil sampling strategies in Australian rangelands. I designed an approach for identifying and mapping soil-class references to assess the effect of land use, agricultural and forestry practices on soil condition at various scales. **Co-PI** of the project **“High-resolution evaluation and monitoring of soil change for the Australian continent”** (**1,671,418 AUD**, approximately **1,036,000 €**) by USyd / CSIRO in alignment with the Australian National Soil Strategy. As a Postdoctoral Research



Associate at USyd I produced 7 datasets of high-resolution digital soil maps at continental scale for the Terrestrial Ecosystem Research Network Soil and Landscape Grid of Australia (**TERN SLGA**) in collaboration with CSIRO, including soil organic carbon (SOC) fractions' stocks and soil fungi and bacteria beta biodiversity. The scripts and maps are available in an open repository following FAIR data principles. At the INRAE Info&Sols unit (Orléans, France) (2014-2018) I developed a new set of pedotransfer functions to predict soil hydraulic properties and produced the *GlobalSoilMap* products of available water capacity for metropolitan France, publicly available for exploitation by end-users (agricultural and land managers, environmental modellers, policy-makers) at the French Government Research Data Portal.

I hold a **PhD in Ecology from Utah State University (USU)** (USA) (2011-2014) with specialization on biogeochemistry of terrestrial ecosystems and soil organic matter. My doctoral research focused on the influence of overstorey species composition on SOC storage, stability, and chemistry in mixed aspen-conifer forests from Utah, applying SOC fractionation methods and soil spectroscopy. The findings contributed to the emerging views on SOC persistence and stabilization and suggest that forest management seeking C sequestration should promote the conservation of aspen forests in western USA. During two short stays (2011, 2012) at the University of Freiburg (Germany) we developed quantitative models for predicting species-derived SOC content applying near-infrared reflectance spectroscopy. Overall, I have over 11 years of international experience as part of groups of global recognition in the fields of soil science, digital soil mapping, forest soils and biogeochemistry. I have participated in 11 R&D projects granted through competitive calls (two of them as PI and one as co-PI) and 4 contracts for technology transfer. I have disseminated the results in international and national conferences and workshops, as well as participated in outreach and communication activities.

My **mentoring and supervision** experience began at USU Forest Soils lab where I trained and supervised 6 technicians and 2 undergraduate researchers. I co-directed the final dissertation of Manon Caubet MSc for the completion of the title Engineer Bordeaux Sciences Agro (France). I co-supervised Dr. Ho Jun Jang for the completion of the PhD in Soil Science at the University of Sydney (Australia), where he is now a postdoctoral researcher. In 2020 I was accredited as PhD lecturer by the ANECA. I am editor for the journal *Soil Security* and reviewer for 9 scientific journals.

Author of **31** peer-reviewed papers, **1** book-chapter. First author of 10 papers: **7** in Q1 journals, **1** in Q2 journals & **2** in non-indexed peer-reviewed journals. 21 papers as co-author: **16** in Q1 journals, **2** in Q2 journals & **2** in non-indexed journals (SJR). Last 5 years (**2019-2023**) **h-index = 14** and **i10-index = 19**.

## **Part C. RELEVANT MERITS**

### **C.1. Publications**

1. Invited review paper. Evangelista, S.J., Field, D.J., McBratney, A.B., Minasny, B., Ng, W., Padarian Campusano, J., **Román Dobarco, M.**, Wadoux, A.M.J.-C., 2024. Chapter One - Soil security—Strategizing a sustainable future for soil, in: Sparks, D.L. (Ed.), *Advances in Agronomy* 183, 1–70. Academic Press, ISBN 9780443295225. <https://doi.org/10.1016/bs.agron.2023.10.001> (**Q1** 2021 Soil Science)
2. Paper. **Román Dobarco, M.**, Padarian Campusano, J., McBratney, A.B., Malone, B., Minasny, B., 2023. Genosol and phenosol mapping in continental Australia is essential for soil security. *Soil Security* 13, 100108. <https://doi.org/10.1016/j.soisec.2023.100108>
3. Paper. Jang, H.J., **Román Dobarco, M.**, Minasny, B., Padarian Campusano, J., McBratney, A., 2023. Assessing human impacts on soil organic carbon change in the Lower Namoi Valley, Australia. *Anthropocene* 43, 100393. <https://doi.org/10.1016/j.ancene.2023.100393> (**Q1** 2022 Earth and Planetary Sciences 50/322)
4. Paper. **Román Dobarco, M.**, Wadoux, A.M.J.-C., Malone, B., Minasny, B., McBratney, A.B., Searle, R., 2023. Mapping soil organic carbon fractions for Australia, their stocks, and uncertainty. *Biogeosciences* 20, 1559–1586. <https://doi.org/10.5194/bg-20-1559-2023> (**Q1** 2022 Earth Surface Processes 10/161)
5. Paper. **Román Dobarco, M.**, McBratney, A.B., Minasny, B., Malone, B., 2021b. A framework to assess changes in soil condition and capability over large areas. *Soil Security* 4, 100011. <https://doi.org/10.1016/j.soisec.2021.100011>
6. Paper. **Román Dobarco, M.**, McBratney, A.B., Minasny, B., Malone, B., 2021c. A modelling framework for pedogenon mapping. *Geoderma* 393, 115012. <https://doi.org/10.1016/j.geoderma.2021.115012> (**Q1** 2021 Soil Science 3/151)
7. Paper. Martin, M.P., Dimassi, B., **Román Dobarco, M.**, Guenet, B., Arrouays, D., Angers, D.A., Blache, F., Huard, F., Soussana, J.-F., Pellerin, S., 2021. Feasibility of the 4 per 1000 aspirational

target for soil carbon: A case study for France. *Global Change Biology* 27, 2458–2477.

<https://doi.org/10.1111/gcb.15547> (Q1 2021 Environmental Sciences 5/373)

8. Paper. **Román Dobarco, M.**, Jacobson, A.R., Van Miegroet, H., 2021a. Chemical composition of soil organic carbon from mixed aspen-conifer forests characterized with Fourier transform infrared spectroscopy. *European Journal of Soil Science* 72, 1410–1430. <https://doi.org/10.1111/ejss.13065> (Q1 2021 Soil Science 13/151)
9. Paper. **Román Dobarco, M.**, Bourenne, H., Arrouays, D., Saby, N.P.A., Cousin, I., Martin, M.P., 2019. Uncertainty assessment of *GlobalSoilMap* soil available water capacity products: A French case study. *Geoderma* 344, 14–30. <https://doi.org/10.1016/j.geoderma.2019.02.036> (Q1 2019 Soil Science 9/158)
10. Paper. **Román Dobarco, M.**, Cousin, I., Le Bas, C., Martin, M.P., 2019. Pedotransfer functions for predicting available water capacity in French soils, their applicability domain and associated uncertainty. *Geoderma* 336, 81–95. <https://doi.org/10.1016/j.geoderma.2018.08.022> (Q1 2019 Soil Science 9/158)

## C.2. Congress

### Oral presentations

1. Invited talk. **Román Dobarco, M.**, Padarian Campusano, J. McBratney, A., Malone, B., Wadoux, A., Ng W., Minasny, B. 2023. Identifying and mapping genosols and phenosols for the evaluation of soil capacity and condition continentally. 4<sup>th</sup> Global Soil Security Conference GSS 2023. Korean Society of Soil Science and Fertilizer. 26-29 June 2023, Seoul, South Korea.
2. Invited speaker. **Roman Dobarco, M.** Soil security for food security. International Workshop "Food security: managing risks in a connected world". Pontificia Universidad Católica de Chile. OECD Co-operative Research Programme: Sustainable Agriculture and Food Systems. 7-8 September 2022, Santiago, Chile.
3. Oral presentation. **Román Dobarco, M.**, Jang, H.J., McBratney, A.B, Minasny, B., Malone, B. Digital pedogenon mapping for assessing changes in soil condition from local to continental scale. 22nd World Congress of Soil Science. 1 July - 5 August 2022, Glasgow, UK.
4. Oral presentation. **Román Dobarco, M.**, McBratney, A.B., Minasny, B. Modeling framework for assessing the effect of recent anthropogenesis on soil dynamic properties. Soil Science Australia and the New Zealand Society of Soil Science. 2021 Joint Conference Soils, Investing in our future. 27 June - 2 July 2021, Cairns, Australia (virtual).
5. Oral presentation. **Román Dobarco, M.**, Saby, N.P.A., Bourenne, H., Cousin, I., Arrouays, D., Le Bas, C., Martin, M.P. Digital soil mapping of available water capacity for metropolitan France. Pedometrics, (June 2017). Wageningen, the Netherlands.
6. Oral presentation. **Román Dobarco, M.**, Lagacherie, P., Ciampalini, R., Arrouays, D., Saby, N.P.A. Ensemble of topsoil texture predictions for Region Centre (France). 7th Global Digital Soil Mapping Workshop. (June 2016). Aarhus, Denmark.
7. Oral presentation. **Román Dobarco, M.**, Van Miegroet, H., Jacobson, A. M. Organo-mineral interactions promote greater soil organic carbon storage under aspen in semi-arid montane forests from Utah. 5<sup>th</sup> International Symposium on Soil Organic Matter. (September 2015). Göttingen, Germany.

### C.3. Research projects

1. **SELVANS, Soil condition and capability mapping for sustainable forest management** (Project number 101063363). Funding: European Research Executive Agency/HORIZON-MSCA-2021-PF-01. HORIZON TMA MSCA **Postdoctoral Fellowships - European Fellowships**. **PI: Mercedes Román Dobarco**, BC3 Basque Centre for Climate Change (15/05/2023-14/05/2025). **181,152.96 €**. Participation: **principal investigator**. Significance: SELVANS implements a novel DSM framework for assessing the effects of contemporary forest management on soil change. SELVANS hypothesizes that the response of indicators of soil condition to management practices will differ by soil class depending on the inherent capacity and the legacy of land use history. SELVANS' outputs will identify thresholds for decline in soil condition and risk of soil degradation, and assess soil health, with an impact for forest management and conservation of soil resources.
2. **High-resolution evaluation and monitoring of soil change for the Australian continent**. Funding: Department of Agriculture, Fisheries and Forestry (Federal)/ Soil Science Challenge. **PI: Budiman Minasny**, The University of Sydney (USyd) (01/07/2022-30/06/2026) **1,671,418 AUD**, approximately **1,036,000 €**. Participation: **Co-PI, responsible for the WP1 pedogenon mapping at continental scale**, recruitment and knowledge transfer to new postdoctoral researchers, reporting.



3. **FL210100054: A calculable approach to securing Australia's soil.** Funding: Australian Research Council, Government of Australia. Australian Research Council Laureate Fellowship Program. **PI:** A. McBratney, USyd (01/01/2022-31/12/2026). **3,277,650 AUD** approximately **2,032,000 €**. Participation: Researcher. Contributed to writing the grant proposal. Design, methodology, and application of the Soil Security Assessment Framework (SSAF), writing 4 peer-reviewed publications, dissemination of results.
4. **Digital Pedogenon Mapping for Australia.** Funding: University of Sydney and the ARC LIEF, 2019 Smith, Muller, Thornber et al. Call: Sydney Informatics Hub HPC Allocation Scheme 2021 for NCI GADI supercomputer. **PI: Mercedes Román Dobarco**, USyd (01/07/2021-30/09/2021). Granted 10,000 service units (equivalent **5,000 hours** in a single 4 GB core). Participation: **PI.** Wrote grant proposal and managed allocated resources, statistical analysis and R scripts for mapping a continental pedogenon map.
5. **GA68437, Forecasting soil conditions.** Funding: Australian Research Council, Government of Australia. Discovery Projects. **PI:** Budiman Minasny, USyd (20/01/2020-19/01/2023). **455,000 AUD (282,100 €)**. Participation: Researcher. Mentoring and supervision of PhD student.
6. **RUEdesSOLS: Reserve Utile en Eau des Sols (Soil available water capacity).** Funding: French National Research Agency (ANR) (France), challenge "Wise Resource Management and Adaptation to Climate Change". **PI:** Isabelle Cousin, INRAE. 2015-2018. **470,000 €**. Participation: Researcher. Development of pedotransfer functions to estimate soil available water capacity for French soils, their applicability domain and associated uncertainty. ([https://www6.inrae.fr/rue-des-sols\\_eng/](https://www6.inrae.fr/rue-des-sols_eng/))
7. **Biotic vs. abiotic influences on the stability of soil organic carbon in aspen-conifer forest ecosystems.** Funding: Utah Agricultural Experiment Station – McIntire-Stennis, (USA). **PI:** Helga Van Miegroet, USU. 2012-2016. **40,000 USD**. Participation: Graduate Research Assistant. Investigated the influence of overstory composition and soil properties on SOC stability, storage, and chemistry in aspen-conifer mixed forests. Soil sampling and field data collection, laboratory analyses for SOC (long-term laboratory incubations, extractions, fractionation, etc.), statistical analyses, writing scientific publications, presentation in international and national conferences.
8. **Soils as the basis for assessment of site condition and ecosystem health.** Funding: Cedar Mountain Initiative (USA). **PI:** Helga Van Miegroet, USU. 2011-2015. **154,000 USD**. Participation: Graduate Research Assistant. Digital soil mapping of SOC concentration for the 0-15 cm soil depth at Cedar Mountain. Field work and soil sampling.
9. **Vegetation impacts on SOC stabilization.** Funding: Utah Agricultural Experiment Station (USA). **PI:** Helga Van Miegroet, USU. 2010-2012. **20,000 USD**. Participation: Graduate Research Assistant. Characterization of SOC fractions' chemistry with mid-infrared spectroscopy, statistical analyses, dissemination of results in a paper and international conferences.

#### C.4. Contracts, technological or transfer merits

1. **Dual Time-Scale Sampling Strategies for large farm soil carbon accounting.** Companies: Carbon Count Pty Ltd, Climate Smart, the University of Sydney (in-kind contribution). Funding: Department of Climate Change, Energy, the Environment and Water, Government of Australia. Call: National Soil Innovation Challenge-Feasibility Study. **PI:** Budiman Minasny, USyd. (01/04/2022-31/07/2022) **69,854 AUD** approximately **43,300 €**. **Transfer of technology:** contribution with DSM methods and pedogenon map used as strata for optimizing soil sampling.
2. **Terrestrial Ecosystem Research Network (TERN) Landscapes "soil biological materials"**, The University of Sydney & CSIRO. Entity: National Research Infrastructure for Australia, Australian Government. **Project director:** Matt Stenson, CSIRO. Project leaders: Ross Searle, Brendan Malone, CSIRO (2019-2022). Participation: Researcher. Development of **7 open datasets of high-resolution digital soil maps** for soil organic carbon (SOC), SOC fractions, coarse fragments, soil bacteria and fungi beta diversity, pedogenon classes, environmental covariates. <https://esoil.io/TERNLandscapes/Public/Pages/SLGA/>
3. **RMQS-RU, Soil texture and data analyses for improving estimates of available water capacity and carbon stocks at the RMQS sites and metropolitan France.** Entity: French Agency for Ecological Transition (ADEME). **PI:** Manuel Martin, INRAE. (01/06/2016-31/05/2018). Participation: Researcher. Produced **two datasets of high-resolution digital soil maps of physical and hydraulic properties** for metropolitan France, *GlobalSoilMap* project.
4. **French soil test database.** Entity: French Ministry of Agriculture. **PI:** Nicolas Saby, INRAE. (Ongoing contract) Participation: Researcher. Developed maps of soil texture in Region Centre (France) combining data mining techniques and advanced geostatistical methods (area-to-point kriging).