

Vasileios Sitokonstantinou

Postdoctoral researcher

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Valencia, Spain

linkedin.com/in/vsito

github.com/Agri-Hub

I develop machine learning methods grounded in causality and interpretability, using Earth observations, climate data, and land use information to analyze the geospatially heterogeneous impact of human actions and weather/climate events on (agro)ecosystem services. I aim to offer data-driven insights for tailored sustainable policies that enhance climate change resilience and expand the global carbon sink while securing food for all.

KEY SKILLS & KNOWLEDGE

data science

remote sensing

machine learning

deep learning

causal AI

scientific coding

signal processing

GIS

HPC

ecosystem services

agronomy

Earth science

Climate science

WORK EXPERIENCE

Postdoctoral researcher

Image and Signal Processing (ISP) group - Universitat de València

06/2023 - Present

Valencia, Spain

The ISP group develops machine learning and vision algorithms for modeling and understanding complex systems.

Achievements/Tasks

- Contributing to [AI4CS](#): Develop novel AI methods to model and understand complex Earth & climate systems
- Working in the area of **causal inference and explainability for agriculture** with [Prof. Gustau Camps-Valls](#)
- Co-supervising 5 PhD students in: *causal effect estimation for trustworthy digital ag.*, *causal inference for understanding food security and human displacements*, *LLMs for causality*, & *yield estimation w/ small data*
- Co-leading the Causality and Hybrid Modeling Seminars: Monthly seminars on theory and apps of causality in RS
- [ELLIS](#) Member

Contact : Gustau Camps-Valls - gustau.camps@uv.es

Research team lead

National Observatory of Athens | BEYOND Unit

10/2019 - 03/2023

Athens, Greece

Leading a research team ([AgriHUB](#)) that focuses on making land ecosystems sustainable with AI and Earth Observation

Achievements/Tasks

- Expanded the team (3 to 10) in two years via attracting new funding
- Set up an AI agenda for the BEYOND unit and positioned a (previously) EO team at the forefront of AI4EO
- Co-authored 20 scientific papers in top AI conferences and EO journals - [Google scholar](#)
- Expanded the user base of the team's [data-driven services](#) with an active engagement plan (4 contracts with ag. companies)

Contact : Haris Kontoes - kontoes@noa.gr

WORK EXPERIENCE

○ Research associate National Observatory of Athens | BEYOND Unit

04/2017 - 09/2019

Athens, Greece

- Achievements/Tasks*
 - Developed the first operational AI&EO system for the monitoring of the CAP - RECAP solution
 - Developed a large-scale food security monitoring system that uses big Earth data and weakly-supervised ML
 - Co-led the organization and writing of successful research proposals - e.g., [DeepCube](#)

Contact : Ioannis Papoutsis - i.papoutsis@noa.gr

SELECTED PUBLICATIONS

Personalizing sustainable agriculture with causal ML (2022). NeurIPS CCAI Workshop. [↗](#)

Best proposal paper

Towards assessing agricultural land suitability with causal ML (2022). IEEE/CVF CVPRW [↗](#)

Evaluating digital agriculture recommendations with causal inference (2023). AAAI-23 [↗](#)

Scalable machine learning pipeline for paddy rice classification using multi-temporal Sentinel data (2021). Remote Sensing [↗](#)

THEMES OF INTEREST

Food Security vs Climate Change

Geospatial personalization of agricultural practices

- Drive sustainability through data-informed policies

Climate-smart farming

Smart farming tools to secure farmers' income & sustainability

- Drive sustainability through the uptake of digital tools

EDUCATION

○ PhD Machine Learning & Remote Sensing National Technical University of Athens (NTUA)

11/2018 - 09/2022

- Thesis*
 - [Big Earth data and ML for sustainable agriculture](#)

○ MSc Space Science Technology & Applications National Observatory of Athens (NOA)

10/2015 - 10/2017

Top of class

○ MSc Wireless & Optical Communications University College London (UCL)

10/2013 - 10/2014

Top 5%

○ BEng Electrical and Electronic Engineering Imperial College London (ICL)

10/2010 - 07/2013

Upper Second

AWARDS

○ NeurIPS - Best proposal paper Tackling Climate Change with AI Workshop 2022 [↗](#)

AWARDS

MyEUSpace Best Idea Award

Degenes: Decentralized Space-to-Ground Data Availability for AI using Blockchain [↗](#)

Copernicus4Regions Success Stories

Reinforcing the Common Agricultural Policy [↗](#)

TRANSFERABLE PROFESSIONAL SKILLS

Project management	Business writing including proposal coordination, EC & ESA project management, deliverables and presentation in review meetings
Organizational	Co-organised and administered workshops, seminars conferences and professional meetings
Leadership	Leader of AgriHUB, a 10-member AI4EO research group of diverse backgrounds, co-supervisor of 5 PhD students
Communication	Experienced in and enjoying giving oral presentations to large audiences

TEACHING/SUPERVISION EXPERIENCE

PhD Thesis Supervision

Interpretable and causal AI for smart farming | Ilias Tsoumas | Wageningen UR

06/2022 - Present

Tasks/Achievements

- Co-supervision with [Prof. I. Athanasiadis](#) from Wageningen UR. I deal with the day to day supervision of the student, as he works in my team that is based in Athens.
- Came up with the topic, co-design experiments, follow the implementation closely, co-author papers.

PhD Thesis Supervision

Causal inference for food security | Jordi Cerdà-Bautista | University of Valencia

07/2023 - Present

Valencia, Spain

Tasks/Achievements

- Co-supervision with [Prof. Gustau Camps-Valls](#). I deal with the day-to-day supervision of the student.
- Reshaped the topic, co-design experiments, follow the implementation closely, co-author papers.

PhD Thesis Supervision

Causal inference for human displacements | José María Tárraga | University of Valencia

07/2023 - Present

Valencia, Spain

Tasks/Achievements

- Co-supervision with [Prof. Gustau Camps-Valls](#) and [Dr. Maria Pilles Guillem](#).
- Follow the implementation closely, co-author papers.

PhD Thesis Supervision

Global yield forecasting with small data | Inti Luna | University of Valencia

03/2024 - Present

Valencia, Spain

Tasks/Achievements

- Co-supervision with [Prof. Gustau Camps-Valls](#) and [Dr. Maria Pilles Guillem](#).
- Co-designed the topic, co-design experiments, follow the implementation closely, co-author papers.

TEACHING/SUPERVISION EXPERIENCE

PhD Thesis Supervision

Hybrid modeling in Earth sciences | Kai-Hendrik Cohrs | University of Valencia

11/2023 - Present

Tasks/Achievements

- Unofficial supervisor on specific topics - student is supervised by [Prof. Markus Reichstein](#) and [Prof. Gustau Camps-Valls](#)
- Assisting the student in specific topics of his PhD - LLMs for causality, co-authoring papers on this topic

MSc Thesis Supervision

The added value of PolSAR data in crop classification | Ms. Maria Ioannidou | AUTH

01/2019 - 07/2020

Tasks/Achievements

- Co-supervised the thesis - daily supervision as a Maria was a member of my team at NOA
- Came up with the idea, followed the implementation and experiments closely, co-authored the paper

MSc Thesis Supervision

Paddy rice mapping in HPC using Sentinel data | Mr. Alkiviadis Koukos | NTUA

10/2018 - 12/2019

Tasks/Achievements

- Co-supervised the thesis - daily supervision as a Alkiviadis is a member of my team at NOA
- Came up with the idea, followed the implementation and experiments closely, co-authored the paper

Satellite Remote Sensing for Hazard Management (MSc)

University of Aegean

10/2019 - Present

Lesvos, Greece

Lectures

- Introduction to Machine Learning for Earth Observation
- Laboratory on Fire and Flood Mapping using Machine Learning

ISPRS SC Summer School 2019: New Remote Sensing Technology for Smart Future

Korea University

10/2019 - 11/2019

Seoul, Korea

Lectures

- Machine Learning and Earth Observation for Food Security Monitoring

Space Science, Technology and Applications (MSc)

University of Peloponnese | National Observatory of Athens

10/2018 - 10/2019

Athens, Greece

Laboratory

- Land cover classification with remote sensing using QGIS

AP2A20 Agricultural Virtual Study Tour

University of Reading

04/2021 - 05/2021

Online

Lectures

- Earth observation and artificial intelligence for sustainable agriculture

The Tipping Point

100mentors.com

11/2016 - Present

Online

Mentoring

- Mentorship on space science and artificial intelligence for students in borderland and island schools of Greece

PUBLICATIONS

Journal

Cloud gap-filling with deep learning for improved grassland monitoring [↗](#)

Author(s)

Iason Tsardanidis*, Alkiviadis Koukos*, Vasileios Sitokonstantinou, Thanassis Drivas, Charalampos Kontoes

Under review

Computers and Electronics in Agriculture

Journal

Causal discovery reveals complex patterns of drought-induced displacement [↗](#)

Author(s)

Jose María Tárraga, Eva Sevillano-Marco, Jordi Muñoz-Marí, María Piles, Vasileios Sitokonstantinou, Michele Ronco
María Teresa Miranda, Jordi Cerdà, Gustau Camps-Valls

2024

iScience

Journal

Recurrent U-Net based dynamic paddy rice mapping in South Korea with enhanced data compatibility to support agricultural decision making [↗](#)

Author(s)

HW Jo, E Park, V Sitokonstantinou, J Kim, S Lee, A Koukos, WK Lee

2023

GIScience and Remote Sensing

Journal

Fuzzy clustering for the within-season estimation of cotton phenology [↗](#)

Author(s)

Sitokonstantinou, V., Koukos, A., Tsoumas, I., Bartsotas, N., Kontoes, C. and Karathanassi, V.

2023

PLOS ONE

Journal

Assessing the added value of Sentinel-1 PolSAR data for crop classification [↗](#)

Author(s)

Ioannidou, M.*, Koukos, A.*, Sitokonstantinou, V., Papoutsis, I. and Kontoes, C.

2022

MDPI Remote Sensing

Journal

A Scalable Machine Learning Pipeline for Paddy Rice Classification Using Multi-Temporal Sentinel Data [↗](#)

Author(s)

Sitokonstantinou, V., Koukos, A., Drivas, T., Kontoes, C., Papoutsis, I., and Karathanassi, V.

2021

MDPI Remote Sensing

Journal

Semantically enriched crop type classification and linked earth observation data to support the CAP monitoring [↗](#)

Author(s)

Rousi, M., Sitokonstantinou, V., Meditskos, G., Papoutsis, I., Gialampoukidis, I., Koukos, A., ... and Kompatsiaris, I.

2020

IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing

Journal

Scalable parcel-based crop identification scheme using Sentinel-2 data time-series for the monitoring of the CAP [↗](#)

Author(s)

Sitokonstantinou, V., Papoutsis, I., Kontoes, C., Lafarga Arnal, A., Armesto Andrés, A. P., and Garraza Zurbano, J. A.

2018

MDPI Remote Sensing

PUBLICATIONS

High impact AI conference

Evaluating digital agriculture recommendations with causal inference [↗](#)

Author(s)

Tsoumas, I.*, Giannarakis, G.*, Sitokonstantinou, V., Koukos, A., Loka, D., Bartsotas, N., Kontoes, C. & Athanasiadis, I. (2022)

2023
In Thirty-Seventh AAAI conference on artificial intelligence

High impact AI conference

Towards assessing agricultural land suitability using causal machine learning [↗](#)

Author(s)

Giannarakis, G., Sitokonstantinou, V., Roxanne, L. and Kontoes, C.

2022
In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)

Workshop in AI conference

Large Language Models for Constrained-Based Causal Discovery [↗](#)

Author(s)

Kai-Hendrik Cohrs, Gherardo Varando, Emiliano Diaz, Vasileios Sitokonstantinou, Gustau Camps-Valls

2024
Are Large Language Models Simply Causal Parrots? Workshop @ the 38th Annual AAAI Conference on Artificial Intelligence

Workshop in AI conference

Causality and Explainability for Trustworthy Integrated Pest Management [↗](#)

Author(s)

Ilias Tsoumas*, Vasileios Sitokonstantinou*, Georgios Giannarakis, Evagelia Lampiri, Christos Athanassiou, Gustau Camps-Valls, Charalampos Kontoes, Ioannis Athanasiadis

2023
NeurIPS 2023 Workshop on Tackling Climate Change with Machine Learning: Blending New and Existing Knowledge Systems

Workshop in AI conference

Towards global crop maps with transfer learning [↗](#)

Author(s)

Jo, HW.*, Koukos, A.*, Sitokonstantinou V., Lee, WK. & Kontoes, C.

2022
In NeurIPS Workshop Climate Change AI

Workshop in AI conference

Evaluating digital tools for sustainable agriculture using causal inference [↗](#)

Author(s)

Tsoumas, I.*, Giannarakis, G.*, Sitokonstantinou V., Koukos, A., Loka, D., Bartsotas, N., Kontoes, C. & Athanasiadis, I.

2022
In NeurIPS Workshop Climate Change AI

Workshop in AI conference

Personalizing sustainable agriculture with causal machine learning [↗](#)

Author(s)

Giannarakis, G., Sitokonstantinou V., Lorilla, R.S. & Kontoes, C.

2022
In NeurIPS Workshop Climate Change AI

Conference

Assessing the Causal Impact of Humanitarian Aid on Food Security [↗](#)

Author(s)

Jordi Cerdà-Bautista, José María Tárraga, Vasileios Sitokonstantinou, Gustau Camps-Valls

2024
IEEE International Geoscience and Remote Sensing Symposium - IGARSS 2024

PUBLICATIONS

Conference

A data cube of big satellite image time-series for agriculture monitoring [↗](#)

Author(s)

Drivas, T.*, Sitokonstantinou, V.*, Tsardanidis, I., Koukos, A., Karathanassi, V. and Kontoes, C.

2022

In 2022 IEEE 14th Image, Video, and Multidimensional Signal Processing Workshop, IVMSP

Conference

Pest presence prediction using interpretable machine learning [↗](#)

Author(s)

Nanushi, O.*, Sitokonstantinou, V.*, Tsoumas, I. and Kontoes, C.

2022

In 2022 IEEE 14th Image, Video, and Multidimensional Signal Processing Workshop, IVMSP

Conference

Towards space-to-ground data availability for the monitoring of the common agricultural policy [↗](#)

Author(s)

Choumos, G.*, Koukos, A.*, Sitokonstantinou, V. and Kontoes, C.

2022

In 2022 IEEE 14th Image, Video, and Multidimensional Signal Processing Workshop, IVMSP

Conference

DataCAP: a satellite datacube and crowdsourced street-level images for the monitoring of the CAP [↗](#)

Author(s)

Sitokonstantinou, V., Koukos, A., Drivas, T., Kontoes, C., and Karathanassi, V.

2022

In International Conference on Multimedia Modeling (pp. 473-478). Springer.

Conference

Scalable distributed random forest classification for paddy rice mapping [↗](#)

Author(s)

Sitokonstantinou, V., Drivas, T., Koukos, A., Papoutsis, I., Kontoes, C. and Karathanassi, V.

2020

In Proceedings of the Asian Remote Sensing Conference

Conference

A Sentinel based agriculture monitoring scheme for the control of the CAP and food security. [↗](#)

Author(s)

Sitokonstantinou, V., Koutroumpas, A., Drivas, T., Koukos, A., Karathanassi, V., Kontoes, H., and Papoutsis, I.

2020

In Eighth International Conference on Remote Sensing and Geoinformation of the Environment

SELECTED SCIENTIFIC PRESENTATIONS

Participated in a number of esteemed venues

NeurIPS, CVPR, Living Planet Symposium, ECMWF-ESA, EGU, AGU, IGARSS etc.

ECMWF–ESA Workshop on Machine Learning for Earth Observation and Prediction

Causal Inference for Sustainable Agriculture ([video](#))

28th International Conference on Multi-Media Modelling (MMM2022)

DataCAP: A satellite datacube and crowdsourced street-level images for the monitoring of the CAP ([video](#))

PROJECTS

AI4CS: Develop novel AI methods to model and understand complex Earth & climate systems (06/2023 - Present) [↗](#)

- Leading causal AI for social impact activities
- Co-supervising 2 PhD students
- Co-organizing Causality and Hybrid Modeling seminars

Causal4Africa w/ Microsoft research (10/2023 - Present) [↗](#)

- Develop causal AI methods for estimating the impact of humanitarian aid in food security in Africa.
- Develop methods on generating causal statements from LLMs (ChatGPT)

ThinkingEarth (02/2024 - Present) [↗](#)

- Develop causal discovery methods for uncovering the drivers of food insecurity in Africa
- Estimate the effect of extreme events on food security
- Develop graph NN to estimate the levels of food security in Africa

EIFFEL (06/2021 - 05/2024) [↗](#)

- Technical supervisor of my organization's activities
- Developed a causal inference framework for assessing land suitability for applying specific sustainable agricultural practices

Excelsior (01/2020 - 06/2027) [↗](#)

- Leading knowledge transfer activities to create and *Earth Observation for Agriculture* department in the newly established Eratosthenes Center of Excellence in Cyprus

e-shape (06/2019 - 06/2023) [↗](#)

- Technical supervisor and coordinator of pilot activities (EU-CAP pilot)
- Developed [agrowth](#): a smart-farming platform for cotton powered by AI and EO - phenology estimation, yield estimation.
- Used causal inference to evaluate the effectiveness of agrowth recommendations.

ENVISION (06/2020 - 05/2023) [↗](#)

- Technical coordinator of the project and technical supervisor of my organization's activities
- Developed a modular AI4EO system to monitor the Common Agricultural Policy - grassland mowing detection, crop classification

CALLISTO (01/2020 - 12/2023) [↗](#)

- Technical supervisor of my organization's activities
- Curated an AI4EO collection of datasets
- Developed a multi-modal system for CAP monitoring - blending satellite-based inferences, street-level image-inferences and UAV inference at the edge

Microservices (12/2021 - 06/2023) [↗](#)

- Technical supervisor of my organization's activities

Transition (06/2021 - 05/2023) [↗](#)

- Technical supervisor of my organization's activities

EOPEN (01/2017 - 12/2019) [↗](#)

- Developed an Big Earth data system that uses weakly-supervised learning for the large-scale food security monitoring

RECAP (11/2016 - 12/2018) [↗](#)

- Developed the first operational AI system that uses remote sensing data for the monitoring of the CAP

ONLINE SERVICES

[agrowth](#) [↗](#)

Phenology and yield predictions

[Corteva sowing maps](#) [↗](#)

Optimal sowing day recommendation system for cotton

[resagri](#) [↗](#)

Weather peril earth warning system

[DataCAP](#) [↗](#)

A comprehensive data system for the monitoring of the CAP: data cube, early warning system of potential non-compliance

OPEN SOURCE DATA AND CODE

CALLISTO AI4EO Dataset Collection [↗](#)

A list of datasets aiming to enable AI applications that use Copernicus and other geospatial data. It is continuously enhanced with more datasets. To further trigger innovation relevant models, Copernicus data and labels are matched.

Paddy Rice Maps [↗](#)

This dataset includes paddy rice maps in South Korea from 2017 to 2021 at 10 m resolution. The paddy rice maps are a product of deep learning model predictions and DO NOT represent ground truth information.

Deep Learning for Cloud Gap-Filling [↗](#)

Cloud Gap-Filling on Normalized Difference Vegetation Index using Sentinel-1 and Sentinel-2 Time-Series

Agriculture Monitoring Data Cube [↗](#)

A Data Cube of Big Satellite Image Time-Series for Agriculture Monitoring

Space-to-Ground Dataset [↗](#)

Space2Ground is a multi-level, multi-sensor, multi-modal dataset, annotated with grassland/non-grassland labels. It combines Sentinel-1 SAR data, Sentinel-2 multispectral data and street-level images for the ML task of grassland detection.

Street-level images annotation [↗](#)

Using the API of the crowdsourcing platform Mapillary, one can automatically download all available street-level images over the area of interest. Then, each downloaded image is matched with the corresponding LPIS object(s) it illustrates.

DataCAP [↗](#)

A data framework for the monitoring of the CAP - Analysis Ready Data (ARD) Sentinel data stored in the Open Data Cube (ODC)

Cotton Phenology Ground Observations [↗](#)

Dataset of phenology ground observations for cotton at the parcel level - in the region of Orchomenos-GR for the cotton cultivation period of 2021.

LANGUAGES

English

Native or Bilingual Proficiency

Greek

Native or Bilingual Proficiency

German

Limited Working Proficiency

Spanish

Limited Working Proficiency

INTERESTS

Improv

Stand-up comedy

Theatre

Traveling

Writing

Guitar

Hiking