



Panagiotis Kosmopoulos

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ABOUT ME

Dr. Panagiotis Kosmopoulos is a researcher at the National Observatory of Athens with 20 years of professional experience through international projects and initiatives, followed by a total budget of almost 120 M €, from which 17.3 M € is related to the renewable energy sector. He has more than 330 publications in scientific journals, books, conferences, workshops and invited talks which have received 3200 citations (h-index 33). He exploits computer and environmental science, Earth observations, big data, artificial intelligence, numerical models and modern technologies for solar power planning and management (from big solar farms to rooftop photovoltaic installations), smart cities & grids, digital twins, airborne wind energy, solar electric vehicles, unmanned aerial vehicles and climate services.

WORK EXPERIENCE

CURRENT Athens, Greece

SENIOR RESEARCHER INSTITUTE FOR ENVIRONMENTAL RESEARCH AND SUSTAINABLE DEVELOPMENT,
NATIONAL OBSERVATORY OF ATHENS

Recent Projects & Role

- ThinkingEarth: Copernicus Foundation Models for a Thinking Earth (1/2024 - 12/2026). Use case leader for Energy communities: Distributed solar energy production forecasting and demand management ([link](#)).
- CiROCCO: Enhancing the in-situ environmental observations across under-sampled deserts (3/2023 - 2/2026). Pilot co-leader for Renewable energy systems planning in Egypt ([link](#)).
- ClimSA: Intra-ACP climate services and related applications programme (1/2021 - 7/2025). Task leader for Climate services for renewable energy in the developing countries ([link](#)).

Recent Publications ([Scopus](#))

- Similarity-Based Solar Power Forecasting: A Technical Advance for Global Energy Systems. Elsevier Energy and AI, 24, 100761, 2026 ([link](#)).
- Green Hydrogen Production to Mitigate Renewable Energy Curtailment in the Greek Grid. MDPI Energies, 19 (10), 2321, 2026 ([link](#)).
- Kite-Based Airborne Wind Energy on Mars: A Hybrid Physics-Analytical and Machine Learning Feasibility Framework with Uncertainty Quantification. Elsevier Energy and AI, 25, 100770, 2026 ([link](#)).
- Planning and Management of Solar Power from Space. Elsevier Academic Press, ISBN: 978-0-12-823390-0, 2024 ([link](#)).
- Multi-Layer Cloud Motion Vector Forecasting for Solar Energy Applications. Elsevier Applied Energy, 353 (Part B), 122144, 2024 ([link](#)).
- Ray-Tracing Modeling for Urban Photovoltaic Energy Planning and Management. Elsevier Applied Energy, 369, 123516, 2024 ([link](#)).

Recent Services

- Athens Digital Twin: A digital model of the city that integrates three-dimensional solar radiation data, shading information, and microclimate conditions, enabling accurate simulation of photovoltaic production on buildings and supporting strategic solar energy planning and management. ([link](#))
- Lower Austria Solar Cadastre: A digital application that supports the local production and consumption of distributed solar energy by using forecasting tools, demand-side management, and self-consumption optimization. It enables citizens & municipalities to share energy, reduce costs & strengthen grid stability. ([link](#)).
- SOLEARTH: A continuous solar radiation and solar energy monitoring and forecasting service delivered through web-based applications and data platforms that provide global, real-time assessments of solar potential. It integrates satellite, ground-based, and modelled big-data sources, applying advanced machine learning and computer vision methods to produce high-accuracy forecasts that support energy planning, operations, and decision-making. ([link](#)).

● EDUCATION AND TRAINING

01/06/2014 - 31/08/2017 Thessaloniki, Greece

PHD Aristotle University of Thessaloniki, Department of Physics

Field of study Renewable energy

Thesis Assessment of the solar energy potential in Greece using ground-based measurements, satellite observations and numerical simulations of radiative transfer models.

Link <https://www.didaktorika.gr/eadd/handle/10442/42775?locale=en>

01/10/2011 - 31/12/2013 Athens, Greece

MSC National and Kapodistrian University of Athens, Department of Physics

01/01/2004 - 31/12/2010 Athens, Greece

BSC National and Kapodistrian University of Athens, Department of Geology and Geoenvironment

● LANGUAGE SKILLS

Mother tongue(s): **GREEK**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C2	C2
FRENCH	B1	B1	B1	B1	B1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● EXPERTISE

Renewable Energy Applications

- Engineering of renewable energy sources: Assessment and experimental measurement of photovoltaic panel efficiency, optimization of operation of large-scale solar parks, penetration of distributed photovoltaics in cities at building roof level, development and implementation of airborne wind energy generation systems, solar electric cars and unmanned aerial vehicles for inspection and maintenance of photovoltaic and solar thermal systems.
- Numerical models: Development and use of radiative transfer model simulation software for real-time estimation and forecasting of solar radiation and energy potential, 3D ray tracing in a variety of urban environments using modern graphics creation platforms, application of causal and probabilistic prognostic methods.
- Ground & satellite observations: Utilization of Earth Observation data for renewable energy applications. Focus on the set of meteorological satellites as well as the atmospheric monitoring service Copernicus, where in the context of the strategic decision to offer new solutions to support renewable energy sources.
- Cloud, Particulate Matter & Built Environment Physics: Multiscale determination of cloud microphysical and optical properties to optimize accuracy of radiative transfer simulations and predictions. Effect of clouds, aerosols and shadows on solar radiation and energy.
- Energy planning & management: Holistic approach to continuous monitoring and forecasting of distributed electricity generation from photovoltaic systems using Earth Observation methods. Development of business plans for the exploitation of solar systems, renewable energy atlas, smart grids, management systems for the transmission and distribution of energy produced from renewable sources at a local (smart cities) and regional scale (state, cross-border applications), autonomous energy islands.
- Smart cities: Study of strategies and progress of cities and municipalities towards the transition from fossil fuels and the energy transition to renewable sources, penetration of distributed photovoltaic systems on the roofs of buildings. Development of solar cadastral applications as well as digital twins to facilitate urban planning, support for distribution managers of the green energy produced and integration into electric smart grids.
- Computer Science & Artificial Intelligence: Leveraging supercomputing and cloud architectures for large-scale distributed computing and big data management for renewable energy support applications. Replacing CPU with GPU processing chains for computationally expensive applications of digital twins, multi-layer computer vision and convolutional neural network predictive techniques.
- Climate services & decision-making applications: Development of climate services related to renewable energy sources in developing countries to support decision-making. Use of modern technologies to build regional resilience to climate change.