Short presentation

My principle area of research interest concerns the framework of micrometeorology and hydrology.
In several years, I have designed and implemented experiments using drone borne Laser scanners (LiDAR), gas analyzers, thermal and multispectral imagery to monitor dynamics of terrestrial ecosystems and urban sites due to climate alterations and anthropogenic activities.

Related projects:

Identification of structural and biophysical alterations in a tropical rainforest due to different land management practices (Central America),

Evaluation of above ground biomass in forests using airborne, drone-based LiDAR observations, and Deep Learning methods (Denmark),

Forecast urban flooding at fine resolution in rapidly expanding cities using Lidar-derived and satellite-based Digital Elevation Models (Africa)

Detection of drought stress of forest trees by combining phenotyping and genotyping (Denmark)

Mapping aerodynamic resistance, above ground biomass, water vapor and CO_2 fluxes in croplands using near surface observations (Denmark)

Assessing the applicability of UAV gas analyzers and photogrammetry to generate maps of CO_2 emissions in an arctic wetland site (Greenland)

Describing the Urban Heat Island phenomenon in a coastal metropolitan under heat wave conditions using the Eddy Covariance method (Greece)

Quantification of evapotranspiration and mercury fluxes in a coastal grassland during drought (Greece)

Education

Ph.D. in Environmental Engineering. PhD Thesis: Energy and Greenhouse Gas Fluxes in Urban and Rural Environments., Implementation of pioneering experiments investigating momentum, scalar and energy fluxes for two coastal Mediterranean sites subjected to extreme climate phenomena. Climate driven vulnerabilities and fundamental mechanisms influencing turbulent idiosyncrasies were clarified and interpreted. Energy flux parameterization was conducted, enhancing the existing theoretical basis for mitigation policies, Democritus University of Thrace
2011 → 2016
Award Date: 8 Jul 2016

MSc. in Hydraulic Engineering. Master Thesis: Energy Fluxes and Urban Heat Island Phenomenon, Application of stochastic and statistical time series analyses in Hydrology, Democritus University of Thrace
2009 → 2010
Award Date: 25 Oct 2010

MSc. in Structural Engineering. Master Thesis:Earthquake Response of a Steel Moment Resisting Frame Structure , Perform static, dynamic, linear and nonlinear finite element analysis to engineering problems, University of Surrey
2008 → 2009
Award Date: 30 Sep 2009

Civil Engineering Degree. Thesis: Hydrological responses of Guadiana River's basin using SWAT model , Democritus University of Thrace
2002 → 2008
Award Date: 31 Jul 2008

Major Collaborations: Drone borne LiDAR and Artificial Intelligence for assessing carbon storage (MapCLand). Project funded by Velux Foundations.
2019 → 2022

Climate Change Resilience in Urban Mobility (CLIMACCESS), Project funded by Danida. Conduct experiments in Accra, Ghana using Lidar-drone system to generate high resolution digital elevation models for areas prone to floods. Assess the influence of climate change on the future precipitation pattern in the region of Ghana.
(https://ign.ku.dk/english/climaccess/)
2018 → Dec 2020

UAS Ability - Research Infrastructure and use of drones for data collection.
2018 → 30 May 2020

PHOTONS and Democritus University of Thrace , Site manager of 'Xanthi' station (http://aeronet.gsfc.nasa.gov/cgi-bin/type_piece_of_map_aod_v3) of AERONET program Operate, calibrate and maintain the automatic sun-sky spectral radiometer, CIMEL No. 193, monitoring the anthropogenic aerosol loading in the atmosphere of a suburban area.
2013 → 2016

FLUXNET Network and Democritus University of Thrace, Site/Flux collaborator of the Greek Station VOCALS (http://www.europe-fluxdata.eu/home/sites-list) Design, install and monitor a field-based experiment, measuring greenhouse gas and surface energy fluxes, utilizing the eddy-covariance method. Identify the main drivers of land atmospheric processes.
2014 → 2015

Data analyst in Thermopolis 2009 Campaign, integrated in the project: Urban Heat Islands and Urban Thermography funded by European Space Agency, Assessment of signal processing, micrometeorological techniques and quality assessment/quality control methods to determine and model the components of the surface energy balance equation.
2011 → 2013

Research Assistant, Concentration levels, source apportionment and dispersion of PM10 associated PAHs at the industrial area of Alexandroupolis, Greece, Democritus University of Thrace
2010

Research Assistant, Project: Development of a simplified regional agricultural drought indicator based on a simple model of water balance from modelling water resources (East Guadiana River basin), Democritus University of Thrace
2007 → 2008

Research outputs

Deep point cloud regression for above-ground forest biomass estimation from airborne LiDAR
Oehmcke, Stefan, Li, Lei, Trepekli, Aikaterini, Caballer Revenga, Jaime, Nord-Larsen, Thomas, Gieseke, Fabian Cristian & Igel, Christian, 2024, In: Remote Sensing of Environment. 302, 21 p., 113968.

Above-Ground Biomass Prediction for Croplands at a Sub-Meter Resolution Using UAV–LiDAR and Machine Learning Methods
Caballer Revenga, Jaime, Trepekli, Aikaterini, Oehmcke, Stefan, Jensen, Rasmus, Li, Lei, Igel, Christian, Gieseke, Fabian Cristian & Friborg, Thomas, 2022, In: Remote Sensing. 14, 16, 22 p., 3912.

UAV-borne, LiDAR-based elevation modelling: a method for improving local-scale urban flood risk assessment
Trepekli, Aikaterini, Balstrøm, Thomas, Friborg, Thomas, Fog, Bjarne, Allotey, A. N., Kofie, R. Y. & Møller-Jensen, Lasse, 2022, In: Natural Hazards. 113, p. 423–451 29 p.

Methods for processing and analyzing UAV-retrieved Lidar and RGB data covering selected areas in Accra
Trepekli, Aikaterini, Fog, Bjarne & Møller-Jensen, Lasse, 16 Feb 2021, Department of Geography & Geology, University of Copenhagen. 18 p.

Deriving Aerodynamic Roughness Length at Ultra-High Resolution in Agricultural Areas Using UAV-Borne LiDAR
Trepekli, Aikaterini & Friborg, Thomas, 2021, In: Remote Sensing. 13, 17, 21 p., 3538.

Fluxes of gaseous elemental mercury on a Mediterranean coastal grassland
Polyzou, C., Loupa, G., Trepekli, Aikaterini & Rapsomanikis, S., 1 Sep 2019, In: Atmosphere. 10, 9, 15 p., 485.

Influence Of Climate Change On The Future Precipitation Pattern In The Region Of Ghana: Climate change resilience in urban mobility
Trepekli, Aikaterini, Friborg, Thomas, Allotey, A. N. M. & Møller-Jensen, Lasse, 2019, 16 p.

Utilization of UAV-Lidar to infer surface roughness and leaf area index of a heterogeneous wooded area
Trepekli, Aikaterini, Westergaard-Nielsen, Andreas & Friborg, Thomas, 2019, In: Geophysical Research Abstracts. 21, 1 p.

Environmental Hazards Methodologies for Risk Assessment and Management: Climate change and climate extremes
Spyridon Rapsomanikis, S. R. & Nicolas R. Dalezios , N. R. D., Feb 2017, *IWA Publishing* . London, UK

Energy flux parametrization as an opportunity to get Urban Heat Island insights: The case of Athens, Greece (Thermopolis 2009 Campaign)
Loupa, G., Rapsomanikis, S., Trepekli, Aikaterini & Kourtidis, K., 2016, In: Science of the Total Environment. 542, p. 136-143 8 p.

Seasonal evapotranspiration, energy fluxes and turbulence variance characteristics of a Mediterranean coastal grassland
Trepekli, Aikaterini, Loupa, G. & Rapsomanikis, S., 2016, In: Agricultural and Forest Meteorology. 226-227, p. 13-27 15 p.

Employment
Guest Researcher
Geography 1

København K
16 Oct 2023 → nu

Guest Researcher
Geography 1

København K
16 Oct 2023 → nu

Assistant Professor
Geography 1

København K
1 May 2018 → 15 Oct 2023

Postdoc
Machine Learning

København Ø
30 Apr 2020 → 22 Jun 2022