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University of Agronomic Sciences and Veterinary Medicine of Bucharest

Faculty of Land Reclamation and Environmental Engineering

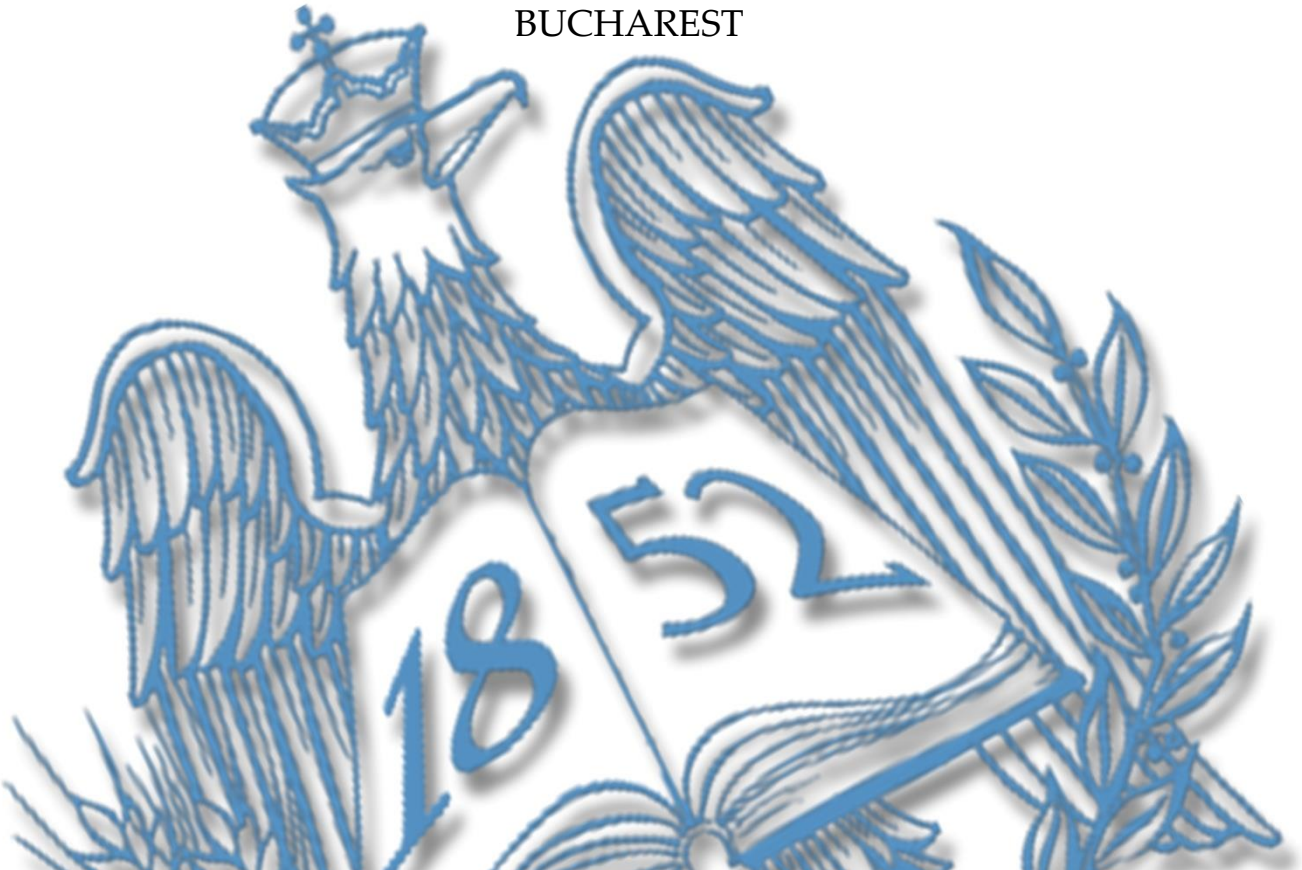
INTERNATIONAL STUDENT SYMPOSIUM "IF IM CAD"

SYMPOSIUM PROGRAM & BOOK OF ABSTRACTS

LAND RECLAMATION, EARTH OBSERVATION & SURVEYING, ENVIRONMENTAL ENGINEERING

5 May 2023

BUCHAREST



UNIVERSITY OF AGRONOMIC SCIENCES

AND VETERINARY MEDICINE OF BUCHAREST

FACULTY OF LAND RECLAMATION

AND ENVIRONMENTAL ENGINEERING

SYMPOSIUM PROGRAM
&
BOOK OF ABSTRACTS

LAND RECLAMATION, EARTH OBSERVATION &
SURVEYING, ENVIRONMENTAL ENGINEERING

5 May 2023

BUCHAREST

The International Student Symposium, IF IM CAD

Organized by:

University of Agronomic Sciences and Veterinary Medicine of Bucharest
Faculty of Land Reclamation and Environmental Engineering

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VENUE

University of Agronomic Sciences and Veterinary Medicine of Bucharest
Faculty of Land Reclamation and Environmental Engineering
Adress: 59 Mărăşti, Bvd, District 1, Zip code 011 464
e-mail: simpozionifimcad@gmail.com
web: http://simpozionifimcad.usamv.ro
Phone: +40 784 276 174

SYMPOSIUM PROGRAM

Friday, 5th May	
Time	**Activity**
08:30 – 9:00	Arrival and registration of participants
9:00 – 9:20	Opening ceremony
9:20 – 11:30	Paper presentations
11:30 – 12:00	Coffee break / Viewing posters and discussions
12:00 – 14:10	Paper presentations
14:10 – 15:00	Lunch
15:30 – 15:45	Participants Award Ceremony & Closing ceremony

DETALIED PROGRAM
LAND RECLAMATION, EARTH OBSERVATION & SURVEYING, ENVIRONMENTAL ENGINEERING

FIFIM BUILDING, SIMION HÂNCU AMPHITHEATER, A II 2

Session chairpersons:
Prof. PhD Raluca - Margareta MANEA
Assoc. Prof. PhD Iulia DANA NEGULA
Lect. PhD Luminița Livia BÂRLIBA

Time: 9:20 – 11:30, May 5

ORAL PRESENTATIONS

Paper ID	Authors	Institution	Paper Title
1.	Alexandru – George - Florian DUMITRESCU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	PRESERVING CULTURAL HERITAGE WITH iPHONE 3D SCANNING
2.	Ana-Maria PREDA[1], Elif ÖZTÜRK[2] -,	[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, [2]Karadeniz Technical University	USING NATURE AS A SUSTAINABLE SOLUTION FOR RESIDENTIAL COMPLEX DESIGN
3.	Larisa-Nicoleta IVU, Iasmina Patricia TODOR, Andra ARBĂNAȘ	Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania", Timișoara	THE TOPOGRAPHICAL STUDY FOR THE UPGRADING OF ELECTRIC PUBLIC TRANSPORT AND THE DEVELOPMENT OF THE NON-MOTORIZED TRANSPORT INFRASTRUCTURE OF THE MUNICIPALITY OF REȘIȚA

4.	Ștefan BĂRBULESCU, Iana Andreea GHIMIȘI (DRAGOMIR), Marcela CHIRU, Denis NENCIU, Daniela VĂCĂROAIA, Beatrice SANDU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	FILAMENTOUS FUNGI AS PRODUCERS OF NATURAL PIGMENTS
5.	Mădălina MELINTE	„Gheorghe Asachi" Technical University of Iași	NADIRAL IMAGES GNSS ASSISTED GEOREFERENCING WITH DIFFERENT NUMBER OF GCPs
6.	Mihaela Alina STILIUC, Cătălin Cezar NEAGU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	STUDY USING LIDAR TECHNOLOGY ON CHANGES OVER TIME IN THE PILCOMAYO HYDROGRAPHIC BASIN IN PARAGUAY IN THE PERIOD 2018-2020
7.	Ionuț Eugen ANCIU, Ștefania Cristina PANĂ, Alexandru FRUNȚEANU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	DYNAMIC ACTIONS ON BUILDINGS
8.	Bianca Maria CREȚ	Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania", Timișoara	THE MODERN MEASUREMENT TECHNOLOGY APPLIED IN MINING PERIMETER EXPLOITATION ACTIVITIES
9.	Elena - Georgiana ZLOTEA, Beniamin-Adelin GARVĂN	University of Agronomic Sciences and Veterinary Medicine of Bucharest	WATER SAFETY PLANNING AS AN EFFECTIVE MEANS OF ENSURING SAFETY OF A DRINKING-WATER SUPPLY SYSTEM

10.	Monica SÎRBU, Amalia RUSU, Nicoleta PAVEL	University of Agronomic Sciences and Veterinary Medicine of Bucharest	MAPPING MARS: HOW THE CURIOSITY ROVER USES PHOTOGRAMMETRY TO EXPLORE THE RED PLANET
11.	Maria Elena POPESCU, Irina Georgiana ZOTA, Ariana Maria DÎRLECI	University of Agronomic Sciences and Veterinary Medicine of Bucharest	DANIEL BERNOULLI – A LIFE DEDICATED TO SCIENCE
12.	Cristian Samuel TEREŞNEU	Transilvania University of Brașov	USING MODERN INFORMATIONAL TECHNIQUES FOR THE ELABORATION OF CADASTRAL DOCUMENTATION
13.	Cosmin-Bogdan DANCIU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	REHABILITATION OF HYDROTECHNICAL WORKS OF AN IRRIGATION PLOT, BABADAG AREA, BABADAG COUNTY, TULCEA

FIFIM BUILDING, SIMION HÂNCU AMPHITHEATER, A II 2

Session chairpersons:
Prof. PhD Carmen CÎMPEANU
Assoc. Prof. PhD Cristian TEREŞNEU
Lect. PhD Patricia MOCANU
Time: 11:30 – 13:30, May 5

ORAL PRESENTATIONS

Paper ID	Authors	Institution	Paper Title
14.	Marius BRATU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	PUMPING INSTALLATIONS FOR WATER SUPPLY AND WATER TREATMENT SYSTEMS
15.	Zina PARASCHIV, Cristina - Andreea POPA	University of Agronomic Sciences and Veterinary Medicine of Bucharest	FOOD FOR A SUSTAINABLE FUTURE

16.	Andra ARBĂNAȘ, Larisa-Nicoleta IVU, Iasmina Patricia TODOR	Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania", Timișoara	THE USE OF UAV AND GNSS TECHNOLOGY FOR THE PERFORMANCE OF SYSTEMATIC REGISTRATION WORKS
17.	Paul BOCU, Alexandru PETRUȘ, Patric BUTNARIU, Gabriel LECA	University of Agronomic Sciences and Veterinary Medicine of Bucharest	THE MONITORING OF EXPOSURE TO ENVIRONMENTAL NOISE
18.	Denisa Andreea NISTOR, Anda Mădălina VUSCAN	Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania", Timișoara	GEOSPATIAL TECHNOLOGIES IN REMOTE SENSING IMAGE PROCESSING
19.	Elena - Mihaela COJOCARU, Diana – Andreea BENESCU, Florentina – Ștefania CIORBĂ, Andrei – Rareș CALEN	University of Agronomic Sciences and Veterinary Medicine of Bucharest	MAPPING FEATURES WITH FIELD MAPS: A FAST AND ACCURATE SOLUTION FOR SPATIAL DATA MANAGEMENT OF THE CAMPUS AGRONOMIE HERĂSTRĂU
20.	Iasmina Patricia TODOR, Larisa Nicoleta IVU, Andra ARBĂNAȘ	Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania", Timișoara	REALIZATION OF TOPOGRAPHIC WORKS FOR UPDATING THE FORESTRY MANAGEMENT PLAN IN THE LOCALITY OF DRINOVA, TIMIȘ COUNTY

21.	Alexandru PETRUȘ, Patric BUTNARIU, Paul BOCU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	THE IMPORTANCE OF GREEN AREAS FOR REDUCING NOISE POLLUTION IN THE URBAN ECOSYSTEMS – OPINION SURVEY
22.	Andra - Ioana BALAUR	The University Politehnica of Bucharest	REVIEW ON AQUAPONIC SYSTEMS AND THEIR POTENTIAL IN THE REALM OF SUSTAINABLE AGRICULTURAL PRACTICES
23.	Estera BIVOLARU, Marcela CHIRU, Daniela VĂCĂROAIA, Denis NENCIU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	WATER QUALITY MONITORING FROM THE PRIVATE WELL
24.	Alexandru -Valentin ANDREI, Gina BUJOR, Ioana MACOVEI, Andra VIȘAN	University of Agronomic Sciences and Veterinary Medicine of Bucharest	CARL FRIEDRICH GAUSS – PRINCEPS MATHEMATICORUM
25.	Gina Magdalena BUJOR, Mirela COTUNA, Vlad EFTIMIE, Andrei BUDU	University of Agronomic Sciences and Veterinary Medicine of Bucharest	THE WONDERS OF THE MICROBIAL WORLD – STATE OF THE ART
26.	Ana JUVERDEANU (TĂNASE)	University of Agronomic Sciences and Veterinary Medicine of Bucharest	ECOLOGICAL RESTORATION PROCESS OF ZAGHEN POLDER TULCEA COUNTY

FIFIM BUILDING, SECOND FLOOR

POSTER PRESENTATIONS

Paper ID	Authors	Institution	Paper Title
1.	Bogdan CONSTANTIN	University of Agronomic Sciences and Veterinary Medicine of Bucharest	WHAT IS A PASSIVE HOUSE?
2.	Radu Mihai TOGĂNEL[1], Ioana-Alexandra MIREA[2]	[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, [2]University of Bucharest	DIGITAL TOOLS FOR THE CONSTRUCTION SECTOR BIM AND GIS

BOOK OF ABSTRACTS

DYNAMIC ACTIONS ON BUILDINGS

Ionuț Eugen ANCIU[1], Ștefania Cristina PANĂ[1], Alexandru FRUNȚEANU[1]

Scientific Coordinators: Assoc. Prof. PhD Eng. Claudiu-Sorin DRAGOMIR[1,2], PhD Eng. Adrian SIMION[2], Lect. PhD Eng. Daniela DOBRE[2,3]

[1]University of Agronomic Sciences and Veterinary Medicine, Faculty of Land Reclamation and Environmental Engineering, Mărăști 59, 011464, București, România, Phone/fax. (+40) 21 3183076
[2]National Institute of Research and Development URBAN-INCERC, 266 Pantelimon Street, District 2, Bucharest
[3]Technical University of Civil Engineering of Bucharest, 122-124 Lacul Tei Blvd., District 2, Bucharest

Corresponding author email: anciuionut21@gmail.com.

Abstract

Introduction. According to the International Organization for Standardization (I.O.S.), action is defined any cause capable of generating states of mechanical stress in a construction. Some of the most common dynamic actions are earthquakes and the action of fire on buildings. Earthquakes are natural, destructive geological phenomena of a random nature both in terms of the causes that produce them and the way they manifest. Fires are caused by insufficient or altogether absent fire protection measures.
Materials and methods. During the tests, the design norms P 100-1/2013 and P118/99 were used to comply with the standards. Two GMS-18 seismic equipment were used to record micro vibrations, one located on the ground floor and the other on the top floor. An expanded polystyrene thermal insulation was used for the fire test.
Results and discussions. The micro-vibration recordings were performed after the fire behaviour test of the thermal insulation to observe the difference between a building in good condition and a damaged building. In the case of the fire test, the resistance performance of the ETICS system was followed.
Conclusion. Following the results obtained, it is recommended to interrupt the thermal insulation of the tested system with non-combustible barrier solutions, to ensure an appropriate degree of fire safety. Afterwards, the recordings, accelerations, displacements and speeds were extracted and processed in order to obtain the amplitude of the accelerations in the frequency domain.

Key words: *irregular buildings, seismic action, seismic instrumentation, thermal insulation, fire action.*

CARL FRIEDRICH GAUSS – PRINCEPS MATHEMATICORUM

Alexandru-Valentin ANDREI, Gina BUJOR, Ioana MACOVEI, Andra VIȘAN

Scientific Coordinator: Lect. PhD Cosmin - Constantin NIȚU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, Faculty of Land Reclamation and Environmental Engineering, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania

Corresponding author email: ioanarobu80@gmail.com

Abstract

Johann Friedrich Carl Gauss, was a German mathematician and physicist who made important contributions to many fields of mathematics and many different domains in science. Sometimes referred to as the Princeps mathematicorum (Latin for "the foremost of mathematicians") and "the greatest mathematician since antiquity", Gauss is considered among the most influential mathematicians throughout history.

Key words*: Carl Friedrich Gauss, mathematics, science, mathematical work, geodesy.*

THE USE OF UAV AND GNSS TECHNOLOGY FOR THE PERFORMANCE OF SYSTEMATIC REGISTRATION WORKS

Andra ARBĂNAȘ, Larisa-Nicoleta IVU, Iasmina Patricia TODOR

Scientific Coordinators: Lect. PhD Eng. Luminița Livia BÂRLIBA, Lect. PhD Eng. Costel BÂRLIBA

Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania", Calea Aradului 119, 300645, Timișoara, Romania,
Phone: +40256 277280, Fax: +40256 200296

Corresponding author email: andra_s.arbanas@yahoo.com

Abstract

Systematic cadastre represents the registration in the land register of all the buildings belonging to an UAT. In order for the field part to have a shorter duration and a higher efficiency, it was chosen to make a flight with WingtraOne GEN II drones, this being one of the most advanced drones, for a better accuracy when georeferenced the images were used in the field "ground control points" for which the coordinates were determined with the help of GPS. For the processing of the data obtained from the field, the AutoCAD and Agisoft programs were used, later the vectorization and identification of the small problems appeared on the orthophotoplan were carried out. These works were carried out for the registration of the buildings in the integrated system of cadastre and land register.

Key words: *drones, systematic cadastre, GNSS, GPS, Agisoft, AutoCAD.*

REVIEW ON AQUAPONIC SYSTEMS AND THEIR POTENTIAL IN THE REALM OF SUSTAINABLE AGRICULTURAL PRACTICES

Andra - Ioana BALAUR[1]

Scientific Coordinator: Lect. PhD Eng. Alexandru Ioan CĂLIN[2]

[1]The University Politehnica of Bucharest, 313 Spl. Independenței, District 6, 011464, Bucharest, Romania

[2]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd,District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: andra.ioana.balaur@gmail.com

Abstract

This article is an overview of the agricultural practice by the name of "aquaponics", which merges aquaculture and hydroponics (growing vegetables in a soilless environment) in a completely controlled environment in order to ensure sustainable food production, thus eliminating the obstacles induced by meteorological conditions, scarce resources, lack of farmland, and other external factors threatening large-scale food security. This paper will present the working principle of this relatively new farming practice and provide a look at the advantages and disadvantages of using aquatics for agricultural production. With a better understanding of this technology and its true potential, all the while taking into account the minimisation of any associated environmental impact, it has been found that aquaponic systems constitute one of the ways of the future in terms of sustainable farming practices.

Key words*: aquaponics, aquaculture, hydroponics, sustainability.*

FILAMENTOUS FUNGI AS PRODUCERS OF NATURAL PIGMENTS

Ștefan BĂRBULESCU, Iana Andreea GHIMIȘI (DRAGOMIR), Marcela CHIRU, Denis NENCIU, Daniela VĂCĂROAIA, Beatrice SANDU

Scientific Coordinator: Assoc. Prof. Biotech. PhD Irina GREBENIȘAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: stefan.barbulescu19@gmail.com

Abstract

The filamentous fungi are among the most dominant phylum in the nature and great due to their significant contributions to biotechnological applications for the welfare of human being. Filamentous fungi are widely distributed in diverse ecological niches and produce extraordinary range of secondary metabolites. The pigments from filamentous fungi were used as food colorants, natural dyes in textile industry, cosmetics and pharmaceutical industry. Natural pigments from filamentous fungi serve as a green alternative to synthetic dyes in food colorants, cosmetics and are biodegradable in nature.

Filamentous ascomycetes fungi are known to produce an extraordinary range of colours. There is a wide selection of non-pathogenic strains of filamentous fungi that are non-toxin producers and can be used as potential sources of natural food colorants with improved functionality. The ability of these fungi to grow on residuals of different complexity (e.g., starch-based, lignocellulose-based residuals) is well-documented, showing versatility regarding different processes that can be built around the filamentous fungi. Unlike the use of pigments from vegetables and fruits, the cultivation of ascomycetes does not compete with agricultural land for food production, and therefore, the synthesis of pigments is faster due to time-efficient and simple fermentation processes. The fermentation processes generate high yields of biomass together with value-added products such as pigments, organic acids and alcohols. Interest in food-grade pigments is because of the pigments' ability to enhance the products' natural color in order to indicate freshness, appearance, safety, and sometimes even to add a novel sensory aspect to attract consumers.

A few strains of ascomycetes filamentous fungi being considered as potential pigment producers include, some strains of Talaromyces (e.g., T. purpurogenus and T. atroroseus producing red pigments), Cordyceps unilateralis (deep blood red pigment), Herpotrichia rhodosticta (orange), Curvularia lunata and several species of Drechslera (many different pigments). Strains of these species are promising because they are non-mycotoxigenic and non-pathogenic to humans. Nevertheless, the individual mycotoxin profiles of these strains remain to be explored. Some other pigment producing fungi for their use in the production of potential food colorants are species of Eurotium and Fusarium oxysporum (yellow and red pigments, respectively), Fusarium fujikuroi (red and orange pigments) and strains of Penicillium such as P. citrinum, P. islandicum, P. aculeatum and P. pinophilum. However, several species of Penicillium are able to produce known toxic metabolites and Eurotium spp. and F. oxysporum have been shown to produce mycotoxins as well. The potential production of mycotoxins is a major problem which limits the commercial application of these strains of fungi. This problem, together with the increasing demand for natural coloring alternatives from both customers and regulators, has triggered investigations and screens for other potential pigment-producing genera of fungi.

In this paper we present the isolation from the environment of some new strains of filamentous fungi on PDA agar culture medium, their cultivation in laboratory conditions for the production of pigments in a liquid medium in a submerged system in incubators with orbital agitation – rotary shaker. We also present the optimization of pigment production on different liquid culture media. The subsequent studies will aim the taxonomic identification of each newly isolated fungal strain, the production of mycotoxins, which could prohibit the use of these fungi as potential producers of useful pigments in the food industry, and last but not least, the isolation and biochemical identification of the molecular structure of pigments produced by these fungi.

Keywords*: new strains of filamentous fungi, natural pigments, submerged fermentation.*

WATER QUALITY MONITORING FROM THE PRIVATE WELL

Estera BIVOLARU, Marcela CHIRU, Daniela VĂCĂROAIA, Denis NENCIU

Scientific Coordinator: Assoc. Prof. Biotech. PhD Irina GREBENIȘAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: esterabivolaru@yahoo.com

Abstract

Mismanagement of drinking water supplies *can pose serious public health risks. There are many concerns about water source management among private well owners, as they are often solely responsible for maintaining their wells, and monitoring and testing of their own water quality. Lack of worry about contamination and a strong sense of control over risks in relation to* drinking water quality *have been identified as important factors that influence peoples' perceptions and behaviour.*

The most effective way to check water supplies for faecal contamination is microbiological analysis, and a range of test methods designed for that purpose has been developed for the water analysis. Instead of carrying out separate tests for each of the potential pathogens, viruses, or parasites that might be in the water, microbiologists test for indicator organisms that are always present when enteric pathogens and viruses are.

Defined substrate technology (DST) developed by IDEXX can produce results in 24 hours. The IDEXX Colilert uses a colourimetric ONPG assay to ***detect coliforms*** *and a fluorescence MUG assay for E. coli. Colilert can simultaneously detect these bacteria within 18-24 hours. It can also suppress 2 million heterotrophic bacteria per 100 mL present. As of 2014, this technology from IDEXX has been published as a European Standard Method, and many countries now use this technology as their gold standard for water testing like Finland and Ireland. The Enterolert Test from IDEXX uses a proprietary Defined Substrate Technology (DST) nutrient indicator to* ***detect enterococci****. This nutrient indicator fluoresces when metabolized by enterococci. DST improves accuracy and avoids the need for hazardous sodium azide suppressants used in traditional media.*

In order to achieve the proposed goal, the groundwater sample taken from a family from Tamasi, Corbeanca commune, Ilfov county was analyzed in the laboratory of Ecology and Environmental Microbiology, F.I.F.I.M., U.S.A.M.V. Bucharest from an organoleptic, physicochemical and microbiological point of view.

The groundwater sample from a private well was taken from the kitchen cold tap water of a family in a sterile glass container for organoleptic, physicochemical and microbiological analyses. The underground water from the private well comes from a depth of 120 m and the drilling is located in Tamasi, Corbeanca commune, Ilfov county. The groundwater sample was transported in a refrigerated box to the laboratory of Ecology and Environmental Microbiology within the Faculty of Land Reclamation and Environmental Engineering within the U.S.A.M.V. Bucharest. The experiments performed and presented in this paper represent a part of the studies performed for the bachelor's thesis.

All analyzes for water quality (colour, taste, smell, pH, turbidity, ammonia, nitrites and nitrates) from the private well fall within the maximum limits allowed by the standards in our country, except for the concentration of water hardness that exceeded the limits allowed. Microbiological analyzes for the detection of faecal contamination of the water sample using classic methods and IDEXX defined substrate technology confirmed the absence of coliform indicator bacteria. The recommendation for bringing the water hardness to optimal parameters and falling within the water quality standards was to install a water softening station.

Key words*: water quality monitoring, private well, organoleptic, physicochemical and microbiological analyses.*

THE MONITORING OF EXPOSURE TO ENVIRONMENTAL NOISE

Paul BOCU, Alexandru PETRUȘ, Patric BUTNARIU, Gabriel LECA

Scientific Coordinator: Assoc. Prof. Biotech. PhD Irina GREBENIȘAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: bocupaul@yahoo.com

Abstract

Environmental noise is a pervasive pollutant that adversely affects the health and well-being of European citizens and wildlife. Although noise is a product of many human activities, the most widespread sources of environmental noise are those related to transport. As a result, noise caused by transport is considered the second most significant environmental cause of ill health in Europe, behind fine particulate matter pollution (WHO and JRC, 2011; Hänninen et al., 2014). According to the World Health Organization (WHO), prolonged exposure to environmental noise is associated with an increased risk of negative physiological and psychological health outcomes (WHO, 2018). These include cardiovascular and metabolic effects, cognitive impairment in children, as well as severe annoyance and sleep disturbance. With projections of rapid urban growth and an increased demand for transport, a simultaneous increase in noise exposure and the associated adverse effects can be anticipated (Jarosińska et al., 2018).

The transposition of Directive 2002/49/EC of European Parliament and of the Council relating to the assessment and the management of environmental noise in Romania was achieved by Law no.121/2019 regarding the assessment and management of ambient noise. This law addresses the avoidance, prevention or reduction of harmful effects, including discomfort, caused by the population's exposure to ambient noise, through the progressive implementation of the following measures: the determination of exposure to environmental noise, through noise mapping, ensuring that information on environmental noise and its effects is made available to the public, adopting, based on the results of noise mapping, action plans to prevent and reduce ambient noise, where appropriate, in particular where exposure levels may cause harmful effects on human health, and to maintain ambient noise levels below defined limit values according to art. 4 point 19, if they are not exceeded. In order to evaluate noise pollution, common methods have been established at the level of the countries of the European Union. These methods evaluate environmental noise and define limit values, based on harmonized indicators to determine the noise level.

The purpose of this work is to present the importance of quiet green recreation areas for people's health. In order to achieve this objective, in this paper we present the method of obtaining comparative geospatial noise maps in crowded intersections (Arcul de Triumf and Casa Presei) and green areas (King Mihai I Park and Herăstrau Agronomy Campus) located in the northern part of Bucharest. To obtain the acoustic pressure values, we used the Sound Meter Coolexp application and a digital sound intensity measuring device - Uni-t UT353 sound meter. We used the obtained data to create geospatial noise maps with the QGIS application.

Key words: *Sound Meter Coolexp application, Uni-t UT353 sound meter, QGIS, comparative geospatial noise maps, green area, crowded intersections.*

PUMPING INSTALLATIONS FOR WATER SUPPLY AND WATER TREATMENT SYSTEMS

Marius BRATU

Scientific Coordinator: Lect. PhD Eng. Dragoș DRĂCEA

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, Sector 1, 011464, București, Romania, Tel: +4021.318.25 .67, Fax:+ 4021.318.25.67,

Corespondent autor email: marius_bratu2000@yahoo.com

Abstract

In this paper we evaluate the behaviour of pumping stations in the town of Băbeni, Vâlcea County, in relation to the drinking water supply, sewage system and its treatment. The stations represent an important environmental impact factor that needs to be carefully managed. They also improve the quality of life of the town's inhabitants. High energy consumption also needs to be reduced, with a secondary impact on the environment. Distribution networks shall be sited in accordance with the conditions of minimum distances from other building networks horizontally and at their junctions vertically, including from the sewerage network. Safety of building networks is one of the key efficiency standards for construction. Quantitative factors also contribute to its improvement.

Key words: *flow, pumping stations, sewage system, treatment, water supply.*

THE WONDERS OF THE MICROBIAL WORLD – STATE OF THE ART

Gina Magdalena BUJOR, Mirela COTUNA, Vlad EFTIMIE, Andrei BUDU

Scientific Coordinator: Assoc. Prof. Biotech. PhD Irina GREBENIȘAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: gina.bujor@gmail.com

Abstract

In this paper we want to present a short review about the amazing activity of microorganisms, which does not cease to surprise us and the various fields of activity where they can be used. Due to the fact that microorganisms have existed on earth for almost 4 billion years, they have been able to develop very complex metabolic pathways that have allowed them to occupy various ecological niches and survive. Also, the complex relationships that have been established over time between different types of microorganisms, and that have begun to be discovered and understood by researchers, open new perspectives for the development of new technologies and environmentally friendly products.

Microorganisms continue to amaze us with their incredible properties: they can be excellent builders, producers of natural pigments for nontoxic dyes, producers of nanoparticles and nanomaterials, purifiers of contaminated air, water and soil, skilled decomposers of countless chemicals (even xenobiotic), recyclers of matter in biogeochemical cycles, etc.

In this paper we will draw attention to how microorganisms can be included in state of the art technologies and products that help the sustainable development of human society in the near future. Thus, we will talk about: eco-friendly biological bricks, building materials from mycelium, biocomposite, the healer fungus, algae-grown limestone concrete, electricity-generating bio-panels, fungi for everyday products, natural microbial dye, bacteria and amazing spider silk.

Keywords: *eco-friendly biological bricks, building materials from mycelium, biocomposite, the healer fungus, algae-grown limestone concrete, electricity-generating bio-panels, fungi for everyday products, natural microbial dye, bacteria and amazing spider silk.*

MAPPING FEATURES WITH FIELD MAPS: A FAST AND ACCURATE SOLUTION FOR SPATIAL DATA MANAGEMENT OF THE CAMPUS AGRONOMIE HERĂSTRĂU

Elena - Mihaela COJOCARU, Diana – Andreea BENESCU, Florentina – Ștefania CIORBĂ, Andrei – Rareș CALEN

Scientific Coordinator: Assist. Drd. Cristina – Elena MIHALACHE

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd, District 1, 011464, Bucharest, România, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: diana.benescu@yahoo.com

Abstract

Geographic Information Systems (GIS) and Field Maps are powerful tools for the management and mapping of various types of geographic data. In this study, we explore the use of these tools to efficiently *register and manage various features of the Campus Agronomie Herăstrău environment. We developed an app using Field Maps that allowed us to collect data on different features of the campus, including buildings, outdoor spaces, and facilities. This comprehensive digital map created of the campus could be accessed and customized by users in real-time, allowing for quick and accurate decision-making.*
Our results show that the use of Field Maps provided an efficient and accurate way to register and manage different features of the campus. The app allowed us to quickly and easily collect data on various features of the campus, including their location, size, and condition. The customizable features of Field Maps also allow us to adapt the map to changing conditions. Our study highlights the potential of Field Maps as a valuable tool for efficient spatial data management. In addition, we examine the broader implications of our study, highlighting the potential for GIS and Field Maps to improve the management of complex geographic systems beyond the context of campus environments.

Keywords: *GIS, Field Maps, Mobile mapping, Spatial data collection.*

WHAT IS A PASSIVE HOUSE?

Bogdan CONSTANTIN

Scientific Coordinator: Lect. PhD Adriana-Magdalena PIENARU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: +4021.318.25.67

Corresponding author email: bogdan_andra01@yahoo.com

Abstract

The present study aims to highlight the energy efficiency of the type of constructions named as "Passive Houses", comparing the energy efficiency of a house built in a conventional way with a house built according to the regulations imposed by the Passive House Institute, having as a reference a classic passive house and a premium passive house.
In the first part, the article presents generalities about what a passive house is and how it is built, what criteria should be followed and how such a project is certified, at the same time it is presented how a residential building is built, in a conventional manner, according to the legislation in force.
In the second part of the article, different systems and components that make up a passive house are shown, how they manage to increase the energy efficiency of a house compared to a conventionally built house, at the same time managing to reduce the carbon footprint and reducing the monthly bills for energy.
In the last part of the article, using graphs and tables, it is shown how the energy efficiency of a house is directly influenced by the chosen systems and their quality, how by respecting the criteria imposed by the Passive House Institute one can obtain a total or only partial improvement in the life quality of the living space, energy independence and at the same time a significant reduction in monthly energy payments.

Key words*: Passive house, energy efficiency, carbon footprint.*

THE MODERN MEASUREMENT TECHNOLOGY APPLIED IN MINING PERIMETER EXPLOITATION ACTIVITIES

Bianca Maria CREȚ

Scientific Coordinator: Assist. PhD Eng. George POPESCU

Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania", Timișoara, Calea Aradului 119, 300645, Romania, Phone: +40256 277280, Fax: +40256 200296

Corresponding author email: popescu.george25@gmail.com

Abstract

Modern technology combined with classical technology plays a fundamental role in engineering activities undertaken in day-to-day operations, with the aim of obtaining the necessary materials for construction or obtaining certain useful materials found near the surface. A significant contribution of this branch of engineering measurements, using modern technology, is manifested through specific studies carried out from the preliminary design phase of the exploitation to the phase where the perimeter is ecologized. The purpose of this article is to test and evaluate the accuracy of data for volumetric predictions of exploited materials, using modern technology and specialized software based on topographic altitude, through which we can create a three-dimensional model of the exploitation perimeter. For this purpose, a suitable surface exploitation was chosen as a case study, referring to the Lucaret-Sud perimeter in Timis county, where the volume of useful material forecasted in the exploitation program for the year 2023 was determined.

Key words*: 3D model, Engineering measurements, Leica GS08, UAV, volumetric calculations.*

REHABILITATION OF HYDROTECHNICAL WORKS OF AN IRRIGATION PLOT, BABADAG AREA, BABADAG COUNTY, TULCEA

Eng. Cosmin-Bogdan DANCIU

Scientific coordinator: Assoc. Prof. PhD Eng. Augustina Sandina TRONAC

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, Sector 1, 011464, Bucharest, Romania, Tel: +4021.318.25 .67, Fax: + 4021.318.25.67

Correspondent author email: danciu.cosmin98@yahoo.com

Abstract

This paper illustrates the current situation of the CA1 adduction canal, the possible technical solutions, the technical comparison between two waterproofing variants, the presentation of the rehabilitation works, as well as the main technological stages of the waterproofing of the canal in the Babadag area, county of Babadag.
Tulcea. The two solutions that will be analysed are the following: the first solution consists in restoring the CA1 channel to its original dimensions and waterproofing it using the following technical solution: waterproofing using 235 g/m2 geotextile + 0.75 mm HDPE geomembrane + C20/25, 8 cm concrete slabs, reinforced with welded mesh, and the second solution is restoring the CA1 channel to its original dimensions and waterproofing it using the following technical solution: waterproofing using EPDM geomembrane reinforced with polyester mesh.
The extension and rehabilitation of the irrigation infrastructure in Romania is expected to have a significant economic impact on the economic viability of farms, increase the competitiveness of farmers, but also support the agricultural sector to be able to face the long-term challenges of climate change, in particular those related to drought, as well as to ensure food stability and security in adverse climatic conditions. In the project we aimed to rehabilitate the hydrotechnical works of an irrigation plot in the Babadag area, we analysed the situation of the whole, we proposed general valid solutions for the condition of the hydrotechnical works and we customised to the situation and technical solutions suitable for the CA1 canal. We have analysed its transport capacity, finding that, if it is decolmated, it meets the flow conditions required for operation, but with a higher water level at the required flow rate.

Keywords*: adduction, canal, geomembrane, geotextile, irrigation, land reclamation, waterproofing****.***

PRESERVING CULTURAL HERITAGE WITH iPHONE 3D SCANNING

Alexandru-George-Florian DUMITRESCU

Scientific Coordinator: Assist. Drd. Cristina-Elena MIHALACHE

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: dumitrescualexander@yahoo.com

Abstract

In the recent twenty years that have passed, technology had exponential growth in a short period. Some devices included LiDAR sensors that are as old as thirteen years today, which would have cost an arm and a leg, and today we find it as a novel feature on the new iPhones. But even though they are present in our lives unknowingly, they are vastly underexploited. In this research we aim to present both advantages and disadvantages of using such complex systems in fields like surveying and terrain modeling, and if a simple iPhone 12 Pro Max using 3D processing software can replace, in the long run, the bulky but reliable 3D scanners. The building chosen is rather a complex one, of historic importance, with many statues and a decorated Art Nouveau facade, from the interbellum period: Casa Mita Biciclista.

Key words*: evolution, 3D scanner, 3D model, Romania, heritage building, Art Nouveau, iPhone.*

THE TOPOGRAPHICAL STUDY FOR THE UPGRADING OF ELECTRIC PUBLIC TRANSPORT AND THE DEVELOPMENT OF THE NON-MOTORIZED TRANSPORT INFRASTRUCTURE OF THE MUNICIPALITY OF REȘIȚA

Larisa-Nicoleta IVU, Iasmina Patricia TODOR, Andra ARBĂNAȘ

Scientific Coordinators: Lect. PhD Eng. Costel BÂRLIBA
Lect. PhD Eng. Livia - Luminița BÂRLIBA

Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania", Timișoara, Calea Aradului 119, 300645,
Romania, Phone: +4025.627.70.09, Fax: + 4025.620.02.96

Corresponding author email: ivularisa@gmail.com

Abstract

The purpose of the topographical survey was to collect data from the field in order to fully upgrade the electric public transport and improving the non-motorized transport infrastructure in the Municipality of Reșița.
The total length of the route that is the subject of this project is 8.5 km, this route includes the following streets: Republic Boulevard, Caransebeșului Route, Timișoarei Route, The December Revolution Boulevard, Ion Luca Caragiale Street, Freedom Street, Traian Lalescu Street, Paul Iorgovici Street and Republic Square.
From the route created for the electric transport infrastructure, the paper presents the first section that includes the part of the roundabout that connects with the Intim passage, that crosses over the railway that connects South Reșița and North Reșița. The study presents the following stages in the fulfilment of the project: the stage of organisation necessary for the realisation of the specialised works, the materials and methods used in carrying out the topographic survey, the processing of the data in order to create the topographical technical documentation that will be made available to the designer.

Key words*: electric transport infrastructure, topographic survey, situation plan.*

ECOLOGICAL RESTORATION PROCESS OF ZAGHEN POLDER, TULCEA COUNTY

Ana JUVERDEANU (TĂNASE)

Scientific Coordinator: Prof. PhD Eng. Ana VÎRSTA

Faculty of Land Reclamation and Environmental Engineering, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania

Corresponding author email: tanaseanatulcea@gmail.com

Abstract

The paper presents the evolution of the process of ecological restoration of the Danube meadow on the territory of Tulcea county, namely the Zaghen Polder.
On the economic, geostrategic, biodiversity importance of the Danube meadow has been written papers since the most distant times, the Romanian researcher Grigore Antipa in 1910 drew attention to the negative effects of damming and drying deltaic wetlands (made for agricultural exploitation reason). As a result of the Danube historic floods in 2006, this topic was reopened and the Romanian legislators issued Decision No. 1208 of September 6, 2006 for the approval and financing of the Program for ecological and economic resizing in the Romanian sector of the Danube Meadow. An important support in this process comes from the WWF International Organization, which campaigns for the implementation of the projects, alongside the decision-making local level institutions, such as Danube Delta Biosphere Reserve Administration (DDBRA). Zaghen polder is an ecological restoration case study of a levee surrounded area on the Danube bank.

Key words*: ecological restoration, Danube meadow, Zaghen polder, hydrotechnical works, habitat.*

NADIRAL IMAGES GNSS ASSISTED GEOREFERENCING WITH DIFFERENT NUMBER OF GCPs

Mădălina MELINTE

Scientific Coordinators: Prof. Habil. PhD Eng. Valeria – Ersilia ONIGA, Lect. PhD Eng. Mihaela MACOVEI

Faculty of Hydrotechnical Engineering, Geodesy and Environmental Engineering, „Gheorghe Asachi" Technical University of Iasi, Professor Dimitrie Mangeron Boulevard 67, 700050, Iasi, Romania

Corresponding author email: madalina.melinte@student.tuiasi.ro

Abstract

Low-cost Unmanned Aerial Systems (UAS) are popular equipments for cadastral mapping because of their advantages. GNSS real-time kinematic (RTK) technology available for low-cost UAS allow precise positioning in real-time kinematic mode. This paper aims to evaluate the process of nadiral images GNSS assisted georeferencing in different scenarios. Using a DJI Phantom 4 RTK UAS, three fights over a residential area have been taken at 60 m height, and 80 m respectively with the camera oriented in nadiral position. A total of 94 points have served as ground control points (GCPs) and check points (ChPs). The GNSS assisted georeferencing process accuracy was tested for 11 different scenarios, using a different number of GCPs starting with 0 up to10 GCPs, obtaining centimeter accuracy.

Key words*: UAS photogrammetry, RTK, DJI Phantom 4 RTK, cadastral mapping, accuracy.*

GEOSPATIAL TECHNOLOGIES IN REMOTE SENSING IMAGE PROCESSING

Denisa Andreea NISTOR, Anda Mădălina VUSCAN

Scientific Coordinators: Assoc. Prof. PhD Eng. Mihai Valentin HERBEI
PhD Eng. Loredana COPĂCEAN

Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania",
Timișoara, Calea Aradului 119, 300645,
Romania, Phone: +40256 277280, Fax: +40256 200296

Corresponding author email: nistor_denisa2000@yahoo.com

Abstract

The main purpose of this paper is to study the dynamics of Timiș county based on spectral information obtained from Landstat 8 satellite imagery. The vegetation dynamic has been expressed differently from the normalized difference indices: NDVI, NDWI, NDSI, NDMI, NDBR and NDBI. With the help of the Arc Map software, one can create maps based on normalized difference indices. Each index has a certain representation: NDVI – vegetation, NDWI – water, NDSI – snow, NDMI – humidity, NDBR – potential of burning vegetation and NDBI – constructions. The presented results present a new, up-to-date method for monitoring the earth's surface based on geomatics technologies.

Key words*: ArcGIS, Landsat 8, maps, NDVI, normalized indices.*

FOOD FOR A SUSTAINABLE FUTURE

Zina PARASCHIV, Cristina - Andreea POPA

Scientific Coordinator: Assoc. Prof. PhD Alina ORȚAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: zina.paraschiv@gmail.com

Abstract

In recent years, attention has been focused on the constant trend of population growth, and the consequent growing demand for food, which classic agriculture can no longer provide. Alternative food like insects, red seaweed, soy, and cell-based products are a sustainable way of changing our diet in order to minimize the environmental impact determined by greenhouse emissions, water, land, and energy use. Consumption of these alternative foods comes new industry vision of what the future of food will look like, and as a result with new regulations. Being novel foods, most people don't have enough knowledge and consider unnatural these new methods of producing them. Surprisingly, alternative foods are particularly rejected by Western societies, which proves that culture impacts a good amount of our beliefs. This current mini-review focuses on explaining what cellular agriculture is, what aliments are considered alternative food and whether we could reach a sustainable future by changing our diet.

Keywords: *sustainable food, alternative food, cellular agriculture, soy protein, cell-based meat.*

THE IMPORTANCE OF GREEN AREAS FOR REDUCING NOISE POLLUTION IN THE URBAN ECOSYSTEMS – OPINION SURVEY

Alexandru PETRUȘ, Patric BUTNARIU, Paul BOCU

Scientific Coordinator: Assoc. Prof. Biotech. PhD Irina GREBENIȘAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: patric.butnariu@gmail.com

Abstract

Important sources for environmental noise exposure are road, railway and air traffic, or building sites. Noise exposure can also occur through other sources such as wind turbines, and leisure activities such as listening to loud music or other audio content including participation in e-sports (video and computer game competitions). Excessive noise can cause annoyance; in addition, research shows it increases the risk for hypertension, sleep disturbance, hearing impairment, tinnitus and cognitive impairment, with increasing evidence for other health impacts such as adverse birth outcomes and mental health problems.
Today, noise pollution is a major environmental problem, cited as a top environmental risk to health across all age and social groups and an addition to the public health burden. Prolonged exposure to high levels of noise impairs human health and well-being, which is a growing concern. Traffic and other urban noises affect not only human well-being, but also disturb and endanger the survival of species crucial to the urban environment. The mental health benefits from natural sounds and general quietness are considered psychological ecosystem services provided by nature. Urban green space and vegetation produce positive psychological effects. Public parks, gardens and other small green areas provide pleasant sounds from nature, such as rustling leaves, swaying tree branches and chirping birds. Quiet urban areas offer acoustic relief to city inhabitants from noisy surroundings, a prerequisite for mental restoration and well-being.
In this paper, we present the results of the questionnaire for the survey of public opinion regarding the perception of the level of noise in the urban ecosystems. The questionnaire contains ten questions and was addressed to various social categories, of age and with different levels of education. The questionnaire, the statistical interpretation and the graphics were made with the help of Google forms.

Key words: *noise pollution, urban environment, ecosystem services provided by nature, green area***.**

DANIEL BERNOULLI – A LIFE DEDICATED TO SCIENCE

Maria Elena POPESCU, Irina Georgiana ZOTA, Ariana Maria DÎRLECI

Scientific Coordinator: Lect. PhD Eng. Patricia MOCANU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd, District 1, Bucharest, Romania

Corresponding author email: r.popescu2013@gmail.com

Abstract

Daniel Bernoulli, doctor, mathematician, teacher of metaphysics and natural philosophy, remained one of the most symbolic figures in the history of science. His name is commemorated by the equation he discovered, a specific example of the conservation of energy known nowadays as Bernoulli Principle. Friend but also rival of Leonhard Euler, Bernoulli is the author of some publications about hydraulics and mathematics. Just as importantly, he had abilities in other fields, earning a PhD in botany and anatomy and his master degree in philosophy. Our article is a journey in the private and professional life of the great Daniel Bernoulli.

Key words*: mathematics, fluid mechanics, Bernoulli equation, potential energy, kinetic energy, incompressible flow.*

USING NATURE AS A SUSTAINABLE SOLUTION FOR RESIDENTIAL COMPLEX DESIGN

Ana-Maria PREDA[1], Elif ÖZTÜRK[2]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania
[2]Karadeniz Technical University, 61080 Trabzon, Turkey

Corresponding author email: anamaria.preda09@gmail.com

Abstract

People will always need a home. Statistically speaking, the next 50 years will be drier than the last 50 years, so society must change its way of building houses. At this moment, most of the houses are built with poor-quality materials, the insulation is of poor quality. Water is used as if it were single-use, and the soil around the house is not used for food but cement is poured over it. This paper presents a model of a residential complex in Romania, that is following the goals of sustainable development. Considering the economic, social, and environmental aspects, the residential complex will lead to the improvement of the quality of life of the people who will live there, the creation of new jobs, and the improvement of the quality of the environment.

Keywords*: house, water, sustainable development, quality.*

MAPPING MARS: HOW THE CURIOSITY ROVER USES PHOTOGRAMMETRY TO EXPLORE THE RED PLANET

Monica SÎRBU, Amalia RUSU, Nicoleta PAVEL

Scientific Coordinator: Assist. Drd. Cristina – Elena MIHALACHE

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: sirbumonicaanamaria@gmail.com

Abstract

The largest and most capable rover ever sent to Mars, Curiosity is a component of NASA's Mars Science Laboratory program who was launched on November 26, 2011 and landed in Gale Crater on Mars on August 5, 2012. Since landing on Mars, the Curiosity rover has explored the 5 km high Mount Sharp (Aeolis Mons) in Gale Crater, climbed over 612 meters, reaching younger and younger rocks. The Mars Science Laboratory (MSL) team can analyse the sedimentary deposits by using a collection of imagers placed on the rover, that provides generous pixel sizes and multiple fields of view from close to long-range observations. For this examination the ChemCam instrument, which is mounted on the rover mast, uses a Remote Micro-Imager (RMI), that functions as a 700 mm-focal length telescope, and a Laser-Induced Breakdown Spectrometer (LIBS). Up to a few kilometres out from the rover, remote outcrops can be observed with the RMI. According to this study an experiment aimed at computing for the first time with RMI Digital Outcrop Models of these remote outcrops as collecting 3D information is essential to characterizing the architecture of the sedimentary deposits. Therefore it is demonstrated how adequate collections of individual RMI frames may be used to successfully apply Structure-from-Motion photogrammetry to rebuild the 3D shape and relief of these remote outcrops. This article aims to showcase the application of photogrammetry in the exploration of Mars, highlighting the ways in which this technology has been utilized to gather and analyze valuable data about the planet's geological features and atmospheric conditions.

Key words*: Curiosity rover, Digital Outcrop Models, MARS Photogrammetry, Structure-from-Motion, 3D.*

STUDY USING LIDAR TECHNOLOGY ON CHANGES OVER TIME IN THE PILCOMAYO HYDROGRAPHIC BASIN IN PARAGUAY IN THE PERIOD 2018-2020

Mihaela Alina STILIUC, Cătălin Cezar NEAGU

Scientific Coordinator: Lect. PhD Eng. Vlad PĂUNESCU

[1]University Of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Mărăști Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: +4021.318.25.

Corresponding author email: cezarneagu98@gmail.com

Abstract

The main objective of the study is to create, with the help of specialized software programs the digital terrain model and the surface terrain model, for a portion of Pilcomayo River located in the central part of South America.
The final result must come in support of the people who will draw up flood scenarios and mitigation plans, due to the fact that the river stream is constantly changing, threatening both the flora and fauna of the area, but also the communities of the people that live near the banks.
As part of the project, volumetric calculations will also be made, which will result in the quantities of excavations and filling that will be necessary to combat possible floods.

Key words*: Lidar, DTM, DSM, floods, risk map.*

USING MODERN INFORMATIONAL TECHNIQUES FOR THE ELABORATION OF CADASTRAL DOCUMENTATION

Cristian Samuel TEREŞNEU

Scientific Coordinator: Assoc. Prof. PhD Eng. Cornel Cristian TEREŞNEU

Faculty of Silviculture and Forest Engineering, Transilvania University of Brașov, 1 Sirul Beethoven Street, 500123 Brasov, Romania, Phone /Fax: +40-268-418600 / +40-268-475705

Corresponding author email: teresneucristi@gmail.com

Abstract

This paper aims to highlight a number of facilities that an engineer in topography can use to automate the elaboration of cadastral documentations. Once the legislation in this field changed, new challenges appeared related to the fast and correct generation of all appendices which are part of any type of documentation. For the proper completion of appendices 13, 14 and 15 all opportunities offered by the Microsoft Excel and Microsoft Word. With regard to appendix 16, the AutoCAD and ArcMap programs were used, with full automation being achieved. VBA code sequences were developed to extras neighbouring parcels from the E-Terra platform and label the arcs with their names. These neighbouring parcels were also analysed in an individual manner with regards to area overlaps. Finally, the whole documentation was completed in an Excel registry, which was afterwards exported into the .pdf format. Testing of this method on 38 cases lead to an eight-fold increase in terms of time efficiency for the completion of cadastral documentations.

Key words*: automation, cadastral documentation, ArcGIS, AutoCAD.*

REALIZATION OF TOPOGRAPHIC WORKS FOR UPDATING THE FORESTRY MANAGEMENT PLAN IN THE LOCALITY OF DRINOVA, TIMIȘ COUNTY

Iasmina Patricia TODOR, Larisa Nicoleta IVU, Andra ARBĂNAȘ

Scientific Coordinators: Lect. PhD Eng. Costel BÂRLIBA
Lect. PhD Eng. Luminița Livia BÂRLIBA

Banat University of Agricultural Sciences and Veterinary Medicine "King Mihai I of Romania",
Calea Aradului 119, 300645, Timisoara, Romania,
Phone: +4025.627.70.09, Fax: + 4025.620.02.96

Corresponding author email: todor_iasmina@yahoo.com

Abstract

This work is a forest management work that aims to develop the cartographic base of the forestry fund, the public property of the state, administered by the Timiș Forestry Directorate, through the Lugoj Forest District, in compliance with the forestry regime. In this work is presented only the production unit III Drinova within the Lugoj Forest District. In order to achieve the topographic elevations of the limits of the forest bodies, a GPS was used using the RTK method, and for the processing and preparation of the cartographic documentation for the thematic digital maps, was used the computer environment Autodesk Raster design. In order to determine the areas and create the production unit maps, there were used the returned aerophotogrammetric plans with level curves at a scale of 1:5000 for the entire area of 12185.39 ha, corrected with recent orthophotoplans and measurements executed with GPS technology.

Key words: *Forest management plan, production unit, cartographic base.*

DIGITAL TOOLS FOR THE CONSTRUCTION SECTOR BIM AND GIS

Radu Mihai TOGĂNEL[1], Ioana-Alexandra MIREA[2]

Scientific Coordinator: Prof. PhD Eng. Raluca Margareta MANEA[1]

[1]Faculty of Land Reclamation and Environmental Engineering, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +40 744 616 566, Email: mihaitoganel@gmail.com
[2]University of Bucharest, Faculty of Geography, 1 Nicolae Bălcescu Boulevard, Bucharest 010041, Romania, Phone: +40725143580, Email: ioana.mirea@s.unibuc.ro

Corresponding author email: mihaitoganel@gmail.com

Abstract

The paper deals with aspects of the digitization of the construction sector, specifically by detailing the process of adopting the Building Information Modelling (BIM) concept in Romania, by comparing it with other European countries. It is based on the data obtained from specialised publications, while also integrating information about the legislative changes proposed for the adoption of BIM. Countries such as Germany, France, or Italy have taken concrete steps regarding the digitization of the construction sector by imposing the use of BIM especially in the projects financed through public funds. In this context, Romania relies on the reforms included in the National Recovery and Resilience Plan and their irreversibility to speed up the digitization of the construction sector.
In order to highlight examples of good practice, references were made to the integration of Geographic Information System (GIS) in cartography and in areas of public administration in Romania, as a component of digitization. Finally, the paper proposes a theme for a transport infrastructure project that will exclusively use digital techniques for the foundation, design, construction and monitoring of the stages related to the investment objective by combining the two tools: BIM and GIS.

Key words*: constructions, digitization, Building Information Modelling, Geographic Information System, transport infrastructure.*

WATER SAFETY PLANNING AS AN EFFECTIVE MEANS OF ENSURING SAFETY OF A DRINKING-WATER SUPPLY SYSTEM

Elena-Georgiana ZLOTEA, Beniamin-Adelin GARVĂN

Scientific Coordinator: Lect. PhD Adriana-Magdalena PIENARU

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: +4021.318.25.67

Corresponding author email: elenazlotea23@gmail.com

Abstract

Effective planning for the supply of safe drinking-water must consider the growing uncertainties associated with a changing climate. Strengthening resilience can support water suppliers to better anticipate, respond to, cope with, recover quickly from, and adapt to, future shocks and stresses associated with climate variability and change. Water safety planning offers a systematic approach to build resilience to current and emerging climate threats by considering the implications of climate variability and change at each stage of the water supply.

In Romania, through the Order no. 2.721/2.551/2.727/2022, regarding the approval of the General Framework for water safety plans (WSP), the responsibilities of competent authorities and water producers and/or distributors regarding the preparation, assessment and approval of water safety plans, have been established.

The obligation to draw up the WSP rests with the producer, in collaboration with the water distributor, depending on the case, the implementation of such a document will be carried out by the water producer/distributor with the support of the WSP team, established at the level of water operators who supply at least 1,000 mc of water/day or supply a community with minimum 5,000 inhabitants.

Key words*: Water Safety Plan, climate variability and change, water producer/distributor.*

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