



Editors

Rui Antonio Rodrigues Ramos
Inga Straupe
Thomas Panagopoulos



Recent Researches in Environment, Energy Systems and Sustainability

Proceedings of the 8th WSEAS International Conference on Energy,
Environment, Ecosystems and Sustainable Development (EEESD '12)

University of Algarve, Faro, Portugal, May 2-4, 2012



CENTRO DE INVESTIGAÇÃO SOBRE
ESPAÇO E ORGANIZAÇÕES

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Preface

This year the 8th WSEAS International Conference on Energy, Environment, Ecosystems and Sustainable Development (EEESD '12) was held at the University of Algarve, Faro, Portugal, May 2-4, 2012. The conference provided a platform to discuss environment and sustainable development, sustainable management, global change, climate and biodiversity, energy storage, solar energy systems, distributed generation, embedded generation, environmental risks etc. with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be sent to international indexes. They will be also available in the E-Library of the WSEAS. Extended versions of the best papers will be promoted to many Journals for further evaluation.

Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Individually Oriented E-Learning Course Development



Professor Sarma Cakula
Dean of Faculty of Engineering
Vidzeme University of Applied Sciences
LATVIA

Abstract: One of the most important prerequisites in base plan for long-term development of all countries is high education level in society what includes e-learning studies. With the progression of e-learning in society there is exponential growth of e-learning resources or knowledge items on the internet observed. Most of e-learning systems do not take into account individual aspects of person, ignoring the different needs that are specific to existing cognitive profiles. Teachers have been forced to search for possibilities to make e-learning more interesting and effective. The goal of the paper is to work out and create theoretical principles of using imitation modelling for e-learning course developing based on ontology for building course methodology for individual use, according to the person's characteristics and performance, depending also on the concepts that the person knows. The objectives of the paper are simulation, ICT ontology and basic theory of sociotics in e-learning. As the result of this technology should be recommendations of methodology of delivering course units for each individual person using e-learning.

Brief Biography of the Speaker: Sarma Cakula was born at 13th December 1960 in Latvia. Graduated with excellence from Latvia University Department of Physics and Mathematics in 1984 and holds Ph.D. in 2002. She started to work in Vidzeme University College (Vidzeme University of Applied Sciences -now) as a teacher. She is a director of Information Technology (IT) professional bachelor program and the Dean of Faculty of Engineering of Vidzeme University of Applied Sciences Latvia now. She is a professor of Information Technologies in the Faculty of Engineering. Also she manages some European and Norway fund projects. She is a member of the International E-Learning Association (IELA), the Latvian Information Technology and Telecommunications Association (LIKTA) and Latvian Universities Professor Association (LAPA). She has more than 30 scientific publications from 2006 in field of information technologies and pedagogic, mostly of them in the field of E-Learning. Also she takes part in Scientific Committee of different international conferences and Editorial Advisory on international journals. Latest of them are: International Online Workshop On "Writing a Research Paper"(IOW-WRP), July 17, 2011, Organized and Technically Co-Sponsored by MASAUM Network; International Conference Virtual and Augment Reality in Education (Vare 2011), 18th March, 2011, Valmiera, Latvia; International Conference on Intelligent Computing & Information Systems, Cairo-Egypt 2011; International Journal of Cyber Society and Education- ISSN 1995-6649 from 2009 , International Conference LEAFA 2010, Hammamet, Tunisia.

Plenary Lecture 2

Utilization of Alternative Power Sources in Modern Low-Energy Buildings in the Conditions of Sustainable Development



Associate Professor Petr Mastny

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Abstract: Reducing consumption of primary energy sources and possibilities to reduce the energy demands of buildings using alternative energy sources are nowadays frequently discussed topics. Current research is at the research center "Centre for Research and Utilization of Renewable Energy Sources" (CRURES) focused on the possibility of increasing the efficiency of multivalent energy systems consisting of renewable energy sources. Regarding current needs the research is focused on the possibilities of using these multivalent systems in modern low-energy construction while meeting the energy-economic indicators.

The aim of the lecture is to describe the current situation within the field of alternative energy sources utilization in modern low-energy construction in the Czech Republic and to show the specifics of the power systems design applying such sources. There are presented the results obtained during the solution of several research projects that demonstrate specific features of multivalent energy systems regarding the energy and economic evaluation of its operation.

Brief Biography of the Speaker: Petr Mastny was born in 1976. He graduated in Electrical Power engineering in 2000 from Brno University of Technology. His Ph.D. he obtained in October 2006. In December 2010 he has been appointed as Associate Professor at Brno University of Technology.

He has been with Department of Electrical Power Engineering, Brno University of Technology, Czech Republic since 2005 and with Centre of Research and Utilization of Renewable Energy since 2010. His current position is assistant professor. His field of interest covers the problems of utilization of renewable energy source and questions of energy management systems with renewable energy sources and their influence on environment. At present he is head worker or co-worker of five research projects in the field of Alternative Power Sources and he cooperates with several private companies to solve of real applications.

Petr Mastny has been member of WSEAS (The World Scientific and Engineering Academy and Society) since 2007, member of NAUN since 2009, member of IEEAM since 2010 and member of CIRED since 2009. He is author of about 70 publications in international scientific journals and conferences in field of Power Engineering and Alternative Power Sources. He has more than 50 presentations in international conferences and technical seminars and he has more than 10 citations in international scientific journals.

Plenary Lecture 3

Environmentally Responsible Sustainable Air and Ground Transportation



Professor Ramesh K. Agarwal

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Abstract: Among all modes of transportation, travel by airplanes and automobiles continues to experience the fastest growth. Currently, there are approximately 500,000 air vehicles (335,000 Active General Aviation Aircraft, 18,000 Passenger Aircraft, 90,000 Military Aircraft, 27,000 Civil Helicopters, and 30,000 Military Helicopters), and 750 million ground vehicles in service worldwide. They are responsible for 50% of petroleum (oil) consumption and 60% of all greenhouse gas (GHG) emissions worldwide. These numbers are forecasted to double by 2050. Therefore the environmental issues such as noise, emissions and fuel burn (consumption), for both airplane and ground vehicles, have become important for energy and environmental sustainability. This paper provides an overview of specific energy and environmental issues related to both air and ground transportation. For air transportation, topics dealing with noise and emissions mitigation by technological solutions including new aircraft and engine designs/technologies, alternative fuels, and materials as well as examination of aircraft operations logistics including Air-Traffic Management (ATM), Air-to-Air Refueling (AAR), Close Formation Flying (CFF), and tailored arrivals to minimize fuel burn are discussed. The ground infrastructure for sustainable aviation, including the concept of Sustainable Green Airport Design is also covered. For ground vehicles, the technologies related to reduction in energy requirements such as reducing the vehicle mass by using the high strength low weight materials and reducing the viscous drag by active flow control and smoothing the operational profile, and reducing the contact friction by special tire materials are discussed along with the portable energy sources for reducing the GHG emissions such as low carbon fuels (biofuels), lithium-ion batteries with high energy density and stability, and fuel cells.

Brief Biography of the Speaker: Professor Ramesh Agarwal is the William Palm Professor of Engineering and the director of Aerospace Engineering Program and Aerospace Research and Education Center at Washington University in St. Louis. From 1994 to 2001, he was the Sam Bloomfield Distinguished Professor and Executive Director of the National Institute for Aviation Research at Wichita State University in Kansas. From 1978 to 1994, he worked in various scientific and managerial positions at McDonnell Douglas Research Laboratories in St. Louis. He became the Program Director and McDonnell Douglas Fellow in 1990. Dr. Agarwal received Ph.D in Aeronautical Sciences from Stanford University in 1975, M.S. in Aeronautical Engineering from the University of Minnesota in 1969 and B.S. in Mechanical Engineering from Indian Institute of Technology, Kharagpur, India in 1968. Over a period of 35 years, Professor Agarwal has worked in Computational Fluid Dynamics (CFD), nanotechnology and renewable energy systems. He is the author and coauthor of over 300 publications and serves on the editorial board of fifteen journals. He has given many plenary, keynote and invited lectures at various national and international conferences worldwide. Professor Agarwal continues to serve on many professional, government, and industrial advisory committees. Dr. Agarwal is a Fellow of fifteen societies - American Association for Advancement of Science (AAAS), American Institute of Aeronautics and Astronautics (AIAA), American Physical Society (APS), American Society of Mechanical Engineers (ASME), Royal Aeronautical Society (RAeS), Society of Manufacturing Engineers (SME), Society of Automotive Engineers (SAE), Institute of Electrical and Electronics Engineers (IEEE), American Society of Engineering Education (ASEE), American Academy of Mechanics (AAM), Institute of Physics, Energy Institute, Institute of Engineering and Technology, Academy of Science of St. Louis, and World Innovation Foundation (WIF). He has served as a distinguished lecturer of AIAA (1996-1999), ASME (1994-1997), IEEE (1994-2011), and ACM (2011). He has received many honors and awards for his research contributions including the ASME Fluids Engineering Award (2001), ASME Charles Russ Richards Memorial Award (2006), Royal Aeronautical Society Gold Award (2007), AIAA Aerodynamics Award (2008), AIAA/SAE William Littlewood Lecture Award (2009), James B. Eads Award of the Academy of Science of St. Louis (2009), SAE Clarence Kelly Johnson Award (2010), SAE Franklin W. Kolk Progress in Air Transportation Award (2010), ASME Edwin Church Medal (2011), AIAA Thermophysics Award (2011) and SAE John Connors Environmental Award.

Plenary Lecture 4

Peat as Sorbent in Nature and Industry



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Abstract: Sorbents are materials that can bind organic and/or inorganic substances, for example, oil hydrocarbons or heavy metals as a result of absorption and/or adsorption processes. A strong natural sorbent is peat affecting development of geochemical barriers for element flows and supporting development of natural trace element archives. Peat is characterised by a developed, complex pore system due to its main component partially decomposed moss organic debris. The porosity ratio of peat is up to 95%, and the value of its specific surface area is usually greater than 200 m² per g. Furthermore, the biodegradation potential of peat is undeniable, and it also has other notable advantages, such as low cost and availability. Equally important, peat is a relatively environmentally friendly substance, which can also be included in the category of renewable resources. Due to these characteristics, peat could be recommended for the production of oil and trace element sorbents. One of the possible ways of treating the polluted areas is the use of peat sorbents. We have demonstrated the possible areas of use of peat and its modification products for oil and other hydrocarbon sorption as well as for sorption of heavy metals. Peat is a prospective material for oil sorption because it has such advantages as low cost, biodegradability and relatively high parameters of specific surface area and porosity.

Brief Biography of the Speaker: Maris Klavins graduated from the University of Latvia in 1979, doctoral dissertation defended in Moscow University (Russia) in 1985, but habilitation thesis in University of Latvia in 1993. Maris Klavins (professor, dr.habil.chem.) is head of Environmental science department of Faculty of Geography and Earth sciences, University of Latvia. M.Klavins is member of editorial boards of 6 scientific journals, member of 3 societies related to environmental chemistry issues and full member of Academy of Sciences of Latvia. M.Klavins has been leader of several projects related to the environmental issues mostly doing with environmental pollution and management, and quality of water, but including also political and social sciences and sustainable development science.

Plenary Lecture 5

Territory Branding Process: Ternate - Tidore Spice Islands, Indonesia



Professor Rui António Rodrigues Ramos

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Abstract: Territory branding strategy recently is adopted to intensify urban competition for resources, markets, opportunities and attention. The main objective of the presented work is to examine the new strategy for territory management through branding for a low GDP territory but with remarkable natural resources. In this case, the environment preservation and the sustainability should be two main focuses for the territory development. The territorial diagnosis will be started by SWOT tools to define vision and mission. Then priority and drivers are formulated to be achieved in the future. Branding, placement and benchmarking are considered as the marketing process which will be followed by strategy implementation in some projects and do it as actions. As the results, the strong territory branding based on its identity can be formulated.

"Spice Islands" is a phrase that associates with spices producer territories. One of them is North Maluku Islands, Indonesia. Almost 57% of its economic backbone is from agriculture, especially in spices. However, unclear territory policy brought North Maluku into static economic growth by running out of natural resources. Spices as the everlasting most valuable commodity in the world markedly by its high price supposed to help people welfare but it does not happen. In order to help this territory to have a new planning point of view, this presentation will address to analyse North Maluku potencies and its territory branding process. Afterword, precise projects and actions will be recommended to realize them. The branding process components allow the territory to build a monitoring and evaluation system.

North Maluku is rich territory with natural resources. In the other hand, static economic growth happened by running out natural resources to be exported as low price products with low quality. To stimulate economic growth, in term of urban planning, brand strategy is an innovative way to drive territory development. By applying "Critical City: Core & Drivers Methodology", North Maluku can be formulated its territory brand:

Vision: The spices victory in the past will be the greatest factory in the future;

Brand: Ternate-Tidore: The Spice Islands

Respected Impacts: developed agriculture investment & management by local farmers and developed agro industry investment & management by local entrepreneurs, good public services by local government, supported infrastructures for people living & industry, natural & cultural events, strong brand & image.

The territory branding process will push the territory North Maluku Islands to be stronger in economic (at the 1st time) by doing actions consistently.

Brief Biography of the Speaker: Rui Ramos is an associate professor of Civil Engineering Department, Engineering School, University of Minho, Portugal. His area of expertise is Urban and Regional Planning and he is a PhD Researcher at Territory, Environment and Construction Centre from University of Minho. In 1993, at University of Minho, he started his regular work as a lecturer and researcher. Since then he published as author or co-author over 60 scientific papers in reviewed journals or presented at international conferences, and 6 PhD and 18 MSc students were graduated under his technical supervision. Moreover, since 2000, he had the opportunity to be an invited Professor at the Department of Transportation of the School of Engineering of Sao Carlos, University of Sao Paulo, Brazil.

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