

NORTH ATLANTIC UNIVERSITY UNION

Editors

Alexander N. Pisarchik
Yilun Shang
Cornelia Aida Bulucea

**Recent Advances in
Communications, Circuits
& Technological Innovation**

- ✦ Proceedings of the 3rd European Conference of Circuits Technology and Devices (ECCTD '12)
- ✦ Proceedings of the 3rd European Conference of Communications (ECCOM '12)
- ✦ Proceedings of the 3rd International Conference on Communication and Management in Technological Innovation and Academic Globalization (COMATIA '12)



Paris, France, December 2-4, 2012

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Keynote Lecture 1

A Way towards Innovation in Academic Libraries: Knowledge Management Implementation



Dr. Octavia Madge

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Abstract: Knowledge management and especially one of its main sub processes, knowledge sharing which leads to innovation and change is nowadays the foundation of organizational development in all fields of activity, including library and information science. In a similar way to the whole higher education sector, academic libraries have passed during the last decades through many transformations. Globalization and networking have brought serious challenges to these institutions and for surviving and being successful in the current environment, they must redesign their management systems and adopt new managerial processes. Academic libraries should build and develop a culture that fosters thinking, learning, creation and sharing of knowledge. But for sharing knowledge is necessary to have within libraries open communication, trust, transparency of decision-making, appropriate rewards, teamwork, co-operation, etc. Higher level of performance and continuous innovation can be achieved by academic libraries through the identification and development of better ways to manage and exploit knowledge assets. A strategy for the future advance of academic libraries in the globalized knowledge-based economy should focus on the implementation of the knowledge management process and starting from a strategic model designed in this sense for the libraries in Romania and researches conducted in a number of structures from this country, the presentation approaches the theme of knowledge management application and the creation of a culture of learning and knowledge sharing in academic libraries.

Brief Biography of the Speaker:

Dr. Octavia-Luciana Porumbeanu Madge is a lecturer at the Library and Information Science (LIS) Department of the Faculty of Letters from the University of Bucharest and the editor of the journal Library and Information Science Research published by the University of Bucharest. She graduated from the LIS Department, has a Master Degree in LIS, and a PhD on Knowledge Management and the Infodocumentary Structures. Her professional activity includes participation in six research projects, six books published, 67 articles, studies and papers at national and international conferences. She also graduated from the Medicine Faculty and is a medical doctor, being currently involved in research on the theme of surgical stenting of the bilio-digestive anastomoses within the Surgery Clinic I from the "Al. Trestioreanu" Oncology Institute Bucharest.

Plenary Lecture 1

Technology and Change Processes in Knowledge Systems



Professor Lesley S. J. Farmer

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Abstract: Change occurs at several levels within any system: the individual, a group, and the system as a whole. At each level, internal or external factors can drive change (although internal factors are usually responses to outside factors). Change can be viewed in terms of the changer and the entity being changed. The theories of change can be approached in several ways: change theory (defining change), the change in terms of the process itself (what occurs), change agency (catalyst for change), and change management. This paper provides representative studies on the change process as it relates to leadership in knowledge systems.

Brief Biography of the Speaker:

Dr. Lesley Farmer, Professor at California State University Long Beach, coordinates the Librarianship program. She earned her M.S. in Library Science at the University of North Carolina Chapel Hill, and received her doctorate in Adult Education from Temple University. Dr. Farmer has worked as a librarian in K-12 school settings as well as in public, special and academic libraries. She is incoming chair of the Education Section of the Special Libraries Association, and is the International Association of School Librarianship Vice-President of Association Relations. Dr. Farmer is a Fulbright Scholar, and has received a university Distinguished Scholarly Activity Award, several professional association awards, and national/international grants. Dr. Farmer's research interests include information literacy, assessment, collaboration, and educational technology. A frequent presenter and writer for the profession, Dr. Farmer has published two dozen professional books, and over a hundred professional book chapters and articles. Her most recent books are *Instructional Design for Librarians and Information Professionals* (Neal-Schuman, 2011) *Using Qualitative Methods In Action Research* (ALA) co-edited with Doug Cook in 2011, and *Youth-Serving Libraries in Japan, Russia, and the United States* (Scarecrow Press, 2012).

Plenary Lecture 2

The Effects of Innovation Poles and Science Parks on Regional Economies in Italy



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Abstract: The increasing interest of EU towards specific structures devoted to stimulate innovation as innovation poles (IP) and science parks (SP) obliges to investigate their role in the overall economic context. The paper examines how performances and characteristics of innovation poles and science park affect various aspects of Italian regional economies at NUTS 2 level. Our main aim is to assess the importance of IP and SP in stimulating growth through innovation, as well as entrepreneurship in the area they are established. First, we test the strength of the relationship between poles' activities and the performance of firms located in the same region. Second, we investigate whether the presence and number of poles have an impact on both incentives to entrepreneurship and survival rates within their respective region. Finally, we shift our focus to each specific structure in order to test how their characteristics affect market performance of associated firms. Each of the three parts include also an aggregation of results by macro-area.

It is important to note how empirical research is mostly descriptive, though we are able to deliver a few useful insights that might be relevant to public decision makers.

Brief Biography of the Speaker:

Massimiliano Ferrara is Professor of Mathematical Economics at "Mediterranea" University of Reggio Calabria where he was also Dean of the degree in Economics. Actually he is the Director of Culture, Education, Research and University Department at Regione Calabria. He was the Founder and Director of MEDAlics and Vice Rector at "Dante Alighieri" University of Reggio Calabria. He was also Visiting Professor at Harvard University, Cambridge (USA), Morgan State University in Baltimore (USA), Western Michigan University (USA), New Jersey Institute of Technology in Newark (NJ) (USA). He was a speaker at several WSEAS international conferences. He is editor of several international journals: *Advances in Management and Applied Economics (AMAE)*, *African Journal of Science, Technology, Innovation and Development Applied Sciences (APPS)*, *International Journal of Functional Analysis, Operator Theory and Applications (IJFAOTA)*, *Far East Journal of Mathematical Sciences (FJMS)*, *Journal of Indian Academy of Mathematics (Jiam)*, *Journal of the Calcutta Mathematical Society* and *Universal Journal of Mathematics and Mathematical Sciences*. His main research interests are: dynamical systems, patterns of growth and sustainable development, mathematical economics, game theory, optimization theory, applied Economics.

Plenary Lecture 3

Relational Databases Used for Exploring Human Sciences in the E-Learning Context



Professor Mirela Voicu

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Abstract: Today, online learning is increasing strongly. The current IT hardware and software tools are capable to provide the necessary support for developing online courses in the context of different business or academic globalization. In this paper we point out some ideas about the cloud computing impact on online learning and some aspects on academic globalization, including the differences which appear between different sciences. The success of online courses is not limited only to performance of the hardware and software tools. These things may be necessary but they are not sufficient. To guarantee the success of an online course, the teaching methods also are very important. If we build attractive courses, we can attract students. There is no monopoly in online learning. Every day a new competitor may appear and we must keep this in mind at each moment of our activity. Only the highest quality of an online course can help us to remain in the online learning market. The teaching quality can be displayed in various ways. For example, in the case of human sciences, e-learning tools can enable some explorations which would not be possible otherwise. In this paper we highlight the possibility of exploring human sciences, using relational databases.

Brief Biography of the Speaker:

Mirela-Catrinel Voicu was born in Romania. In 1995, she graduated from the Faculty of Mathematics and Computer Sciences, West University of Timisoara. She received the MSc degree in Applied Mathematics, Informatics in Economy and Computer Sciences from the West University of Timisoara. She followed a training course for PhD thesis at the National Institute for Statistics and Economic Studies, Paris, France. She received her PhD in 2001 from the University of Timisoara, Romania (with the "Cum laude" distinction) and from the University of Paris 13, France (with the "Très honorable avec félicitations" distinction). Currently she is a Professor at the Department of Business Information Systems, within the Faculty of Economics and Business Administration, West University of Timisoara, Romania, where, since 1995, she has held several academic positions. Her activity includes Programming and Internet Programming, Informatics in Economy, Databases, OOP, Data structures. She has 85 papers in conference proceedings or refereed journals (from these papers, 32 have been presented or published abroad). She has published 8 books (1 book in France, 2 book in Germany and 6 books in Romania). She is a reviewer and a member in international program committee of various WSEAS conferences from abroad, reviewer at "Journal of Knowledge, Communications and Computing Technologies", member in the teams of 9 research projects (one of which is international) and project manager for one research project. Since 2002, she is a member of INFOREC (Romanian Association for Economic Informatics Training Promotion), since 2005, she is a member of WSEAS (World Scientific and Engineering Academy and Society) and since 2009, she is a member of SCT (Society for Computing Technologies).

Plenary Lecture 4

Promoting Technological Innovation with In-service Education



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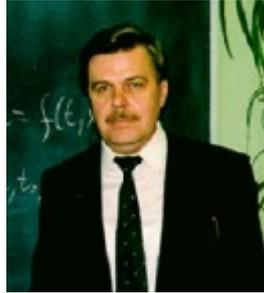
Abstract: This longitudinal, empirical research was set out to identify the connection between technological innovation and in-service education. In-service education has become a well known solution toward the exploding knowledge. Complexity theory has also become influential in recent models social science. In the context of innovation and new technologies, most applications have focused on individually technology adoption or technology diffusion, while the topic of the innovation process via on-going learning has received less attention. This paper present both models based on the complexity theory and authentic application of teacher in-service to illustrate an innovation paradigm. A meta-data was applied to identify the evidence between innovation and in-service activity. The methodological challenges and critiques that remain were also discussed in this study.

Brief Biography of the Speaker:

Huei-Mei Wei graduated from the National Kaohsiung Normal University, Taiwan in 1998. She is a member of Taiwan association for sexual education, as the member of a council, she presented a lot of paper about the teenager's sexual education in international conference or journals. Besides, she is the research group of Yearbook of Teacher Education Statistics in Taiwan , collect the data of in-service teacher and pre-service teacher, certification assessment, teacher recruitment...etc., analysis the data bank of teacher education, help the authorities to make polices. She presented a lot of paper about the analysis procedure to study Taiwanese teachers in international conference or journals.

Plenary Lecture 5

Analog Phase-Locked Loop Analysis



Professor Gennady A. Leonov

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Abstract: PLL was invented in 1930s-1940s and was used in radio and TV (synchronization, demodulation and frequency synthesis). Nowadays PLL can be produced as a single integrated circuit. There are several types of PLL (classical analog PLL, ADPLL, DPLL, and others) and its modifications (Costas loop, PLL with square, and others) which are used widespread in a great amount of modern electronic applications (telecommunications, computers architectures and others). Various methods for analysis of phase-locked loops are well developed by engineers, but the problems of construction of adequate nonlinear models and nonlinear analysis of such models are still far from being resolved. As was remarked in a plenary lecture at ACC-2002, the main direction in modern literature, devoted to the analysis of stability and synthesis of PLL, is the use of simplified linear models, the methods of linear analysis, empirical rules, and simulation. However it is well known that the application of the methods of linearization and linear analysis without justification can lead to wrong results.

Numerical simulation of PLL in signals space is, as a rule, rather laborious because a simulation step, which must be sufficiently small to distinctly observe the dynamics of phase detector, makes difficult the observation of the dynamics of all systems. The simulation in phase-frequency space permits one to overcome these difficulties but requires the construction of the corresponding models of PLL and also can lead to untrue results. It was shown analytically the possibility of the existence of hidden oscillations in two-dimensional model of PLL: with the computational point of view in the considered system all the trajectories tend to equilibrium, but, in fact, a domain of attraction of equilibria is bounded.

In this survey, it is described the general approach to nonlinear analysis and design of analog phase locked loop, which are based on the construction of nonlinear mathematical models in signal and phase-frequency space and applying rigorous mathematical the methods of nonlinear analysis of high-frequency oscillations.

Brief Biography of the Speaker:

Gennady A. Leonov received his PhD (Candidate Degree) in mathematical cybernetics from Saint-Petersburg State University in 1971 and Dr.Sci. in 1983. From 1985 – he is full professor at the Mathematics and Mechanics Faculty. He has been vice-rector of Saint-Petersburg State University from 1986 to 1988. Now Gennady A. Leonov is Dean of Mathematics and Mechanics Faculty (since 1988), Director of Research Institute of Mathematics and Mechanics of St.-Petersburg State University (since 2004), Head of Applied cybernetics Department (since 2007).

Professor G.A. Leonov authored and co-authored 300 books and papers. His research interests, now in qualitative theory of dynamical systems, stabilization, nonlinear analysis of phase synchronization systems and electrical machines.

Plenary Lecture 6

Impact of Nonlinear Effects in Optical Fiber Communications



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Abstract: Nonlinear effects in optical fibers impose different limitations on the communications link, and an understanding of such effects is almost a prerequisite for actual lightwave-system designers. On the other hand, they offer a variety of possibilities for all-optical signal processing, amplification and regeneration. Using conventional optical fibers for these applications, a length of several kilometres is usually required due to their relatively small nonlinear parameter ($\chi^{(3)}$). Such long fibers pose some practical limitations, concerned namely with the size and stability of the system. The required fiber length is reduced to about 1km using highly nonlinear silica fibers with a smaller effective mode area, and hence, a larger nonlinear parameter ($\chi^{(3)}$). A further reduction in fiber length by one order of magnitude has been achieved in recent years using nanowires and microstructured optical fibers with an extremely small effective mode area and significantly enhanced nonlinear characteristics. Another main advance was the production of highly nonlinear fibers using materials with a nonlinear refractive index higher than that of the silica glass, namely lead silicate, tellurite, bismuth glasses and chalcogenide glasses. Using such fibers, the required fiber length for nonlinear processing can be dramatically reduced to the order of centimetres. In this paper we review the effects – both detrimental and potentially beneficial – of optical nonlinearities both in conventional and in highly nonlinear fibers.

Brief Biography of the Speaker:

Mario F. S. Ferreira graduated in Physics from the University of Porto, Portugal, and he received the Ph.D. degree in Physics in 1992 from the University of Aveiro, Portugal, where he is now a Professor at the Physics Department. His research interests have been concerned with the modeling and characterization of multi-section semiconductor lasers for coherent systems, quantum well lasers, optical fiber amplifiers and lasers, soliton propagation, polarization and nonlinear effects in optical fibers. He is actually the leader of the Optics and Optoelectronics Group of the I3N – Institute of Nanostructures, Nanomodelling and Nanofabrication. He has written about 300 scientific journal and conference publications, a book with the title: “Optics and Photonics” (Lidel, 2003, in Portuguese) and another with the title: “Nonlinear Effects in Optical Fibers” (John Wiley & Sons, May 2011).

He is a member of the Optical Society of America (OSA), SPIE - The International Society for Optical Engineering, The New York Academy of Sciences (NYAS), the American Association for the Advancement of Science (AAAS), the European Optical Society (EOS), the European Physical Society (EPS) and the Portuguese Physical Society. He served in various committees of the Optical Society of America (OSA) and of SPIE – The International Society for Optics and Photonics, having been also a member of the Telecommunications Committee of the “International Association of Science and Technology for Development” (IASTED). He served also in the technical committees of various international conferences. He is presently an Associate Editor of “Optical Fiber Technology- Materials, Devices, and Systems” (Elsevier) and a member of the Advisory Board of “Fiber and Integrated Optics” (Taylor & Francis), “Nonlinear Optics, Quantum Optics” (Old City Publishing, Inc.), “Research Letters in Optics” (Hindawi Publishing Corporation), and “International Journal of Optics” (Hindawi Publishing Corporation).

Plenary Lecture 7

The Second Order Characteristics Analysis by Using the Probability Density Functions of Signals and Derivatives in Two Time Instants for SSC Combiner in Fading Channels



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Abstract: Fading is one of the most important causes of degradation signals in wireless communication systems. Ricean fading is a stochastic model for radio propagation anomaly caused by partial cancellation of a radio signal - the signal arrives at the receiver by several different paths, and at least one of the paths is changing - lengthening or shortening. Rician fading occurs when one of the paths, typically a line of sight signal, is much stronger than the others.

Rayleigh fading is the specialised model for stochastic fading when there is no line of sight signal, and is sometimes considered as a special case of the more generalised concept of Rician fading. In Rayleigh fading, the amplitude gain is characterized by a Rayleigh distribution. Nakagami-m distribution describes multipath scattering with relatively large delay-time spreads, with different clusters of reflected waves are described. In that way good fits to collected data in indoor and outdoor mobile-radio environments are provided. Slow fading can be caused by events such as shadowing, where a large obstruction such as a hill or large building obscures the main signal path between the transmitter and the receiver. The amplitude change caused by shadowing is often modeled using a log-normal distribution with a standard deviation according to the log-distance path loss model.

In telecommunications, a diversity scheme refers to a method for improving the reliability of a message signal by using two or more communication channels with different characteristics. The diversity plays an important role in combatting fading effect and co-channel interference and avoiding errors. It is based on the fact that individual channels experience different levels of fading and interference. Multiple versions of the same signal may be transmitted or received and combined in the receiver.

When space diversity is used the signal is transmitted over several different propagation paths. In the case of wireless transmission, it can be achieved by antenna diversity using multiple transmitter antennas (transmit diversity) and/or multiple receiving antennas (reception diversity). In the latter case, a diversity combining technique is applied before further signal processing takes place. Various diversity combining techniques can be distinguished. At Selection Combining (SC), from N received signals, the strongest signal is selected. At Switched Combining the receiver switches to another signal when the currently selected signal drops below a predefined threshold. This is a less efficient technique than selection combining, but less expensive, too. The expressions for probability density functions (PDFs) of the signal time derivatives at two time instants for output signals from dual branch SSC combiner in the presence of different fading distribution (Rayleigh, Rician, Nakagami-m, log-normal) are derived. The second order characteristics such as the average level crossing rate and the average fade duration for complex combiner who makes the decision based on sampling in two time instants are calculated by using the obtained closed-form expressions. It is shown that performances are improved in this case.

Brief Biography of the Speaker:

Dragana S. Krstic was born in Pirot, Serbia. She received the BSc, MSc and PhD degrees in electrical engineering from Department of Telecommunications, Faculty of Electronic Engineering, University of Nis, Serbia, in 1990, 1998 and 2006, respectively. Her field of interest includes telecommunications theory, optical communication systems, wireless communication systems, satellite communication systems etc. She works at the Faculty of Electronic Engineering in Nis since 1990. She participated in more Projects which are supported by Serbian Ministry of Science. She has written or co-authored about 150 papers, published in Journals and at the International/National Conferences. She has also reviewed more articles in IEEE Transactions on Communications; IEEE Communications

Letters; ETRI journal; C&EE Journal; Electronics and Electrical Engineering (Elektronika ir Elektrotechnika) and other journals. She is the reviewer of the papers for many conferences and the member of technical program committees and international scientific committees of several scientific conferences.

Plenary Lecture 8

Impact of Rain Models towards Earth-to-Space and Terrestrial Communication Systems



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Abstract: Rain attenuation refers primarily to the absorption of a microwave radio frequency (RF) signal by atmospheric rain, and losses are especially prevalent at frequencies above 10 GHz.

Many rain attenuation studies are based on data collected from the temperate regions. These data were reportedly did not perform well when applied to tropical regions that experience high intensity of rain rate. This has resulted in urgent needs to perform rain attenuation studies in Malaysia. Prediction models are used to provide the best possible estimates given the available information. Using these models, the rainfall rate can be known and thus, the attenuation due to rain can be predicted. There are several rainfall rate and attenuation models that are developed by many researchers. Many researchers have developed models that can be used to estimate one-minute rainfall attenuation distribution; there is still some confusion with regard to choosing the right model to predict attenuation for the location of interest. Thus, the existing prediction models need to be tested against the measured results from tropical regions, by this it can be known that these existing prediction models are applicable to the tropical climates. Therefore, it is very important to need to know the measured data from tropical regions to choose the right model and to propose new prediction models for these regions. This speech aims to increase the available database on earth-to-space propagation at Ku/Ka/V-band.

Brief Biography of the Speaker:

Mandeep Jit Singh received his B.Eng. (with honors) and Ph.D. degrees in electrical and electronic engineering from the University of Notrumbria, UK, and Universiti Sains Malaysia, in 1998 and 2006, respectively. From 2006 up to June 2009, he was attached at Universiti Sains Malaysia as a Lecturer. Currently, he is attached to the Universiti Kebangsaan Malaysia as a Senior Lecturer. His areas of specialization are radiowave propagation in satellite communication system, radar, antenna design, RF, and microwave. His current research collaboration is with the Association of Radio Industries and Business (ARIB) Japan to analyze the rain fade at Ku-band in tropical climate using satellite involving countries such as Thailand, Philippines, Indonesia, and Fiji. Singh has published 90 papers in journals, most in his special field radiowave propagation. He has reviewed more than 100 articles from IEEE Journals to PIERS Journals. He has an h-index of 6 and over 100 citations.