

Northumbria University
School of Computing, Engineering and Information Sciences
Weekly Lunch Time Lectures and Research Seminars – 2010
Time: 1-2 pm

Location: Ellison Building - Room E005

Name	Title	Date
Bartholomew Aleke <i>IMI Research Group, CEIS, NU</i>	Developing a Model for Information and Communication Technology Diffusion among Small and Medium sized Agribusiness Enterprises in Southeast Nigeria. <i>The research explored diffusion of ICT innovation process among the proprietors of Small and Medium sized Agribusiness Enterprises in the study area based on United Nations ICT centre project currently under construction within the Agribusiness communities in Southeast Nigeria. The research sought to establish the possible effective strategy to actualise the maturation of the technology innovation in order to avoid both project failure or discontinuance after adoption. It is a multi-dollar project which Nigeria government went into counterpart funding arrangement with United Nations Industrial Development Organisation. Therefore this research was commission to explore the end user engagement aspect of the project. The results achieved will be highlighted in the presentation.</i>	3 Feb 2010
Professor Hakan Hellbergh <i>Director, Manufacturing & Industrial Strategy, North SNA Europe AB, Sweden</i>	Why is there an R in R&D? <i>The lecture will highlight some of the benefits of using a scientific approach in industrial research and development. Examples of university research programmes that have assisted in the development of new products and processes, will be presented as well as a discussion of the criteria needed for fruitful co-operation between universities and industry. The lecture should be of immense interest to Scientists, Engineers, Designers and Technologist.</i>	10 Feb 2010
Professor Ahmed Bouridane <i>IMLab Research Group, CEIS, NU</i>	Emerging Biometric Security - Iris & Palmprint Recognition Technology <i>The use of biometric signatures, instead of tokens such as identification cards or computer passwords, continues to gain increasing attention as an efficient means of identification and verification of individuals for controlling access to secured areas, materials, or systems and a wide variety of biometrics has been considered over the years in support of these challenges. Iris and Palmprint recognition, as emerging biometric recognition approaches, are becoming a very active topic in both research and practical applications. This seminar will introduce the concept of both biometric modalities including all the steps of a practical biometric system ranging from pre-processing, recent state of the art feature extraction methods and effective classifiers as used in commercial systems as well the mathematical modelling of data for each case will be presented and discussed. Finally, recent results obtained in terms of recognition accuracy including false alarm will be assessed to demonstrate the usefulness of each modality and their deployment for practical security problems.</i>	17 Feb 2010
Dr Yakov Shnir <i>Durham University</i>	Black Holes and Monopoles <i>A general overview of gravitating multimonopoles and different monopole-antimonopole systems in $d=3+1$ is presented. We discuss a relation of these field configurations with the corresponding black holes and/or Bartnik-McKinnon type solutions. It turns out that these monopole-antimonopole solutions of the Einstein-Yang-Mills-Higgs model are rather similar with new static, asymptotically flat solutions of the $SU(2)$ Einstein-Yang-Mills theory in $4+1$ dimensions, subject to bi-azimuthal symmetry. The results are also compared with similar solutions of the $SU(2)$ Yang-Mills-dilation model.</i>	24 Feb 2010
Elizabeth Lomas <i>IMI Research Group, CEIS, NU</i>	Continued Communications: Working to Maximise the Business Value of Communications Through a Co-operative Inquiry <i>Computer mediated communications (email, LinkIn, Pbwiki etc) are now prime tools for negotiating and conducting business. They have diverted recorded information, held in structured systems, into narrative channels that may flow in and beyond the business boundaries into a Web 2.0 world. New ways of managing information, leveraging collaborative network advantage and assessing risk are required to navigate through the new business information context. 'Continued Communication' is a co-operative inquiry group of 80 international co-researchers from across disciplines using a mixed methods approach to undertake research and produce outputs to focus businesses on the possibilities and pitfalls of engagement in this new landscape.</i>	3 March 2010
Osemeke Mosindi <i>IMLab Research Group, CEIS, NU</i>	Organizations as Complex Social Networks: Understanding Information Behaviour, a methodological approach <i>This talk will be based on my methodology till date, and how I have gone from different approaches to finding an approach to study Information Behaviour and its link to organizational performance, through using social network analysis, and application of systemic thinking. Also looking at the limitations of researching organizations from an experiential point of view, and how I have tried to ensure validity and rigour in my research amidst these limitations.</i>	10 March 2010

<p>Ogah Ogah ESAM Research Group, CEIS, NU</p> <p>Qing Lu NCRLab, CEIS, NU</p>	<p style="text-align: center;">TBA</p> <p style="text-align: center;">Design of High Efficiency Class-F and Class-F⁻¹ Amplifiers for use in Linear and Circular Polarised Active Integrated Antenna</p> <p>The overall objective of the proposed research is to investigate the design of three different types of high efficient amplifiers and three possible structures of antennas. The most suitable candidates of the amplifiers and the antennas would then be integrated to develop a compact module that could be used in a transmitter of a wireless communication system. In the design of the amplifiers, antennas and their integration there are many design parameters, complex equations and conflicting objective functions and hence it is very difficult to obtain the required solutions using mathematical analytical techniques. It is therefore proposed to use Genetic Algorithm (GA) which is based on a stochastic search method to obtain global solutions to obtain optimum designs. The basic principles, implementation and application of GA to obtain optimum design of a dual frequency matched antenna will be presented.</p>	<p style="text-align: right;">17 March 2010</p>
<p>Han Lai IMLab Research Group, CEIS, NU</p> <p>Wichian Ooppakaew, NCRLab, CEIS, NU</p>	<p style="text-align: center;">Knowledge Seeking in KM - Towards an Adapted KM Cycle</p> <p>Current knowledge management (KM) thinking and practices are all regarding knowledge in organizations as a valuable strategic asset and trying to employ information and communication technology to capture and leverage knowledge to gain competitive advantage for organizations. These mainstream KM perspectives have called forth sharp criticism by some researchers who argue that KM is nonsense and is not different from information management. This research discusses the key issues concerning knowledge, and the difference between knowledge seeker and knower. Based on the characteristics of knowledge and learning in workplace, a new concept is introduced into KM: knowledge seeking, and proposes a new KM cycle, arguing that knowledge seeking, as a learning process, is the crucial part in knowledge management. This conceptual paper, providing a new perspective for organizations implementing knowledge management, enhances our understanding and development of KM research and practice.</p> <p style="text-align: center;">Advanced Signal Processing Techniques for High Speed Long Range Underwater Communications using Steerable Acoustic Transducer Arrays.</p> <p>At present time there is no acoustic transmitter array which allows precise control of the amplitude and phase of the signal. Such an array would allow considerably higher bit rates than currently achieved. An array is also of interest to the neutrino astronomy community as it would allow precise calibration of existing and planned acoustic neutrino telescopes. This talk will outline the acoustic transmitter array designed and employed at the field, as well as signal processing techniques applied to the measured data from the site.</p>	<p style="text-align: right;">24 March 2010</p>
<p>Dr James McLaughlin IMLab Research Group, CEIS, NU</p>	<p style="text-align: center;">Magnetism made visible: Magnetohydrodynamics and the Solar Corona</p> <p>Magnetohydrodynamics (MHD) unites two disciplines: electromagnetism and fluid dynamics. The Sun acts as a unique laboratory for illustrating astrophysical magnetohydrodynamics, and I am interested in applying the MHD equations to various problems in solar and astrophysical plasmas. I have a particular interest in MHD wave behaviour in inhomogeneous media. My current research involves numerical modelling of MHD wave activity in solar active regions and solar plumes, along with their comparison to satellite data. This talk will cover the fundamental equations of magnetohydrodynamics, illustrate their surprisingly rich structure, and demonstrate mathematical modelling of solar phenomenon (specifically MHD wave propagation in inhomogeneous media).</p>	<p style="text-align: right;">31 March 2010</p>
<p>Remi Aninat ESAM Research Group, CEIS, NU</p> <p>Yuan Yuan Jiang NCRLab, CEIS, NU</p>	<p style="text-align: center;">Investigation and Development of CuIn_{1-x}Al_xSe₂ for Photovoltaic Solar Cells</p> <p>Cu(In_{1-x}Al_x)Se₂ (CIAS) is a very promising semi conductive material for photovoltaic applications. By varying the Al/In ratio, this alloy can be pitched to any specific bandgap within the range 1.0eV to 2.7eV, and is therefore particularly suitable as an absorber layer in single and multi junction solar cells. In this presentation will be given a general introduction to the photovoltaic conversion process that turns the light received from the sun into electricity, and subsequently described the work done on optimising CIAS' specific fabrication process.</p> <p style="text-align: center;">Satellite Communication (SatCom) On-The-Move Antenna</p> <p>This will be a talk on my PhD research project, which is SatCom On-The-Move Antenna that operates in Ku (14 GHz Uplink, 11-12GHz Downlink) radar Band. Such antenna provides services for both commercial and military applications including: TV receiver only for entertainment, internet access and high data rate full duplex services for businesses, emergency services and military communications on-the-move. In my presentation, an overview of Satellite Communication and SatCom On-The-Move systems will be given first of all. SatCom On-The-Move antenna design obstacles and existing/commercially available design solutions will be outlined. Then I will focus on the novel design approach of my project and current research results.</p>	<p style="text-align: right;">14 April 2010</p>

<p>Pietro Maiello ESAM Research Group, CEIS, NU</p> <p>Fahd N Khan D&M Research Group, CEIS, NU</p>	<p>Emerging and Novel Materials for Thin Film Photovoltaic Cells</p> <p>Solar Photovoltaics (PV) has the greatest potential to meet World energy needs, nowadays crystalline silicon technologies dominate and cost are reducing but further reductions are needed. Thin-Film PV technologies are the most promising route to reduce the costs; these will pave the way for future competitive PV electricity. However, Multi-TW markets (2nd half of the century) – require long-term sustainability and the best current thin-film technologies are based on rare and high cost materials such as indium, gallium and tellurium. This research will investigate the properties of sustainable new materials, which use cheaper and more abundant elements to replace the indium and gallium (such as antimony and bismuth).</p> <p>Application of Advanced Surface Engineering Technologies to Tungsten Carbide tipped (TCT) Bandsaws Blades</p> <p>Bandsawing is an important metal cutting operation carried out in a variety of steel industries in order to the remove raw material for secondary operations. Bandsawing operation offers numerous advantages such as high cutting rate, low kerf loss, longer tool life and high automation possibilities due to its efficient and continuous cutting action. Development of new carbide rich, wear resistant and difficult to cut materials (hot and cold working high speed tool steels, nickel based super alloys and titanium alloys impose greater demands on bandsawing operations. To enhance the performance of these bandsaw blades, surface coatings are applied. This seminar summarizes the various coatings that are applied on the carbide tipped bandsaw teeth, and their performance in terms of fundamental knowledge associated with forces, power, specific cutting energy and metal removal rates.</p>	<p>21 April 2010</p>
<p>Dr Wai Ming Cheung D&M Research Group, CEIS, NU</p>	<p>Engineering Information and Knowledge in Collaborative Product Development</p> <p>This presentation focuses on my research expertise in managing engineering information to support the product development process. My research is concerned with the techniques and methods on capturing and better understand of the knowledge and information needs to support the product development process and throughout the product's lifecycle from concept design to disposal. The research work is aimed at producing knowledge and information management models, methods and tools to meet the challenges of the new commercial environment.</p>	<p>28 April 2010</p>
<p>Mahinsasa Narayana ESAM Research Group, CEIS, NU</p> <p>Freeborn Bobor-Oyibo NCRLab, CEIS, NU</p>	<p>Generic Maximum Power Point Tracking Controller for Variable-speed Fixed-pitch Small Wind Turbines</p> <p>To obtain the optimal operating point of a wind turbine, rotor-generator characteristics should be known and this is different from one system to another. This makes it difficult to design a universal Maximum Power Point Tracking (MPPT) controller, particularly for small-scale wind energy system. Therefore, there is a need for an efficient MPPT controller for small wind turbines to operate without predetermined turbine characteristics. In turbulent wind environment, control of variable-speed fixed-pitch wind turbine systems to continuously operate at the maximum power points becomes difficult due to fluctuation of wind speeds. Then special emphasis is given to operating at optimum power points of the system. In this study, an Adaptive Filter is introduced to identify sensible inputs to the controller and Fuzzy Logic is used to develop a generic MPPT control mechanism for applications on variable-speed fixed-pitch small-scale wind turbines.</p> <p>Mutual Coupling Effects in a Multiple Switched Beam Smart Antenna</p> <p>The total radiated field of an array antenna with the same types of elements is normally taken as the product of the antenna element factor and the array factor. However when these antenna elements are arranged in array, it is possible that some radiation from each of the elements could couple one another. Accurate determination of this mutual coupling between the array elements is important factor which need to be considered when designing smart antenna systems to fully enjoy the benefits of the antenna.</p>	<p>5 May 2010</p>
<p>Matthew Moynihan ESAM Research Group, CEIS, NU</p> <p>Xuan Tang NCRLab Research Group, CEIS, NU</p>	<p>Thin-Film Copper-Zinc-Tin-Selenide Photovoltaic Cells</p> <p>Photovoltaic cells as a source of electricity have been available for decades, but are still an expensive source of energy. Current technology relies on cells that are either expensive to manufacture, contain rare and expensive metals, or both. Cells using a Copper-Indium-(Gallium)-Selenide (CI(G)S) absorber layer are efficient and the device structure lends itself to large-scale low-cost manufacture, but they require expensive and rare metals. CZTS has properties very similar to CI(G)S and the device structure is identical, but it does not require expensive and rare indium; thus it is being investigated as a possible alternative for making high efficiency cells.</p> <p>Differential Polarization Phase Shift Keying (DPolPSK) for Optical Free Space Communications</p> <p>In this scheme the information is encoded in both polarization and phase of the carrier signal before being transmitted over the free space channel. At the receiver DPolPSK symbols are demodulated by the optical delayed interference and the electrical multilevel detection, without using any polarization control or polarization selection at the receiver. An overview of the proposed system together with theoretical as well as simulation results will be presented</p>	<p>12 May 2010</p>
<p>Dr David Wainwright & Adrian Small IMI Research Group, CEIS, NU</p>	<p>Prototyping in SharePoint</p> <p>Experience and outcomes of a recent Collaborative Innovation Project (CIP) with local industry using SharePoint will be discussed. The project involved modelling and mapping some of the processes of a housing services sector company and creating prototypes in SharePoint to manage the processes.</p>	<p>19 May 2010 okay</p>

<p>Sirichai Triamlumlerd IMLab Research Group, CEIS, NU</p> <p>Draco Aluya Iyi D&M Research Group, CEIS, NU</p>	<p align="center">Identifying People's Intentions from Natural Language Texts</p> <p><i>This research is aimed at analyzing intention from ordinary language texts and producing a computer model of human agents, their intentions and actions. Modelling intention analysis is part of the current active research area of sentiment analysis. This depends on several active research areas in Natural Language Processing (NLP), and text analysis including co-reference analysis, information extraction, semantic analysis and the so on. The research will be focused on the legal domain. What is interesting here is that the domain is challenging, and subject to argument and interpretation even by literate people, such as legal professionals. Secondly, the legal domain impacts on ordinary people. Consequently, automatic analysis techniques are potentially useful in the legal discovery process, or in investigating case law.</i></p> <p align="center">A STUDY ON LOW SPEED TURBULENT FLOWS ASSOCIATED WITH COMBINED RADIATION, HUMIDITY AND NATURAL CONVECTION HEAT TRANSFER</p> <p><i>The transfer of heat by natural convection affected by humidity and radiation in an enclosure is importance in many engineering and engineering related applications such as computer and electronic box cooling, solar collectors and nuclear reactors cooling, and in the design of industrial and domestic buildings for thermal comfort. The problem is quite relevant to complex systems typical of weapons analysis and many other applications. This research is focused on the physics of interactions between humidity, thermal radiation and turbulent natural convection in an enclosure.</i></p>	<p>26 May 2010</p>
<p>Prof. Julie McLeod IMI Research Group, CEIS, NU</p>	<p align="center">The use of SharePoint in Higher Education</p> <p><i>This talk shares the findings from an investigation into the uptake and use of SharePoint in UK Higher Education Institutions (www.northumbria.ac.uk/sharepoint_study). The project, funded by Eduserv (www.educserv.org.uk), involved telephone interviews with 40 IT Directors/Project Managers supplemented by an online survey, three case studies and an online community consultation and revealed how SharePoint is being used, critical success factors for implementing SharePoint and lessons learned. Some of these are being used in a new project within the IMI Research Group that is exploring the use of new technologies to support the research function.</i></p>	<p>2 June 2010</p>
<p>Edward Bentley PaWE Research Group, CEIS, NU</p> <p>I Kade Wiratama D&M Research Group, CEIS, NU</p>	<p align="center">Application of Spectrum Analysis to the Location of Transient Disturbances within a Power System</p> <p><i>My earlier work related to the development of a location system for disturbances within a power system using an Artificial Neural Network. The system developed proved able to locate the source of a single disturbance within a power system, but would not locate a multiplicity of sources. Further work has been carried out to enable multiple sources to be coped with using a technique known as 'Cepstrum Analysis'. Progress is reported.</i></p> <p align="center">Advance Techniques in Design of Wind Turbines for Low-Wind Regions</p> <p><i>Advance techniques for designing blades for a large wind turbine operating in high wind speed is investigated with the aim of controlling the system in load alleviation. The emphasis of this research is on the feasibility study of using advanced technique, which are originally for blade load alleviation, to increase the energy capturing capability of the blades for more efficient wind turbine suitable for region with low wind speed.</i></p>	<p>9 June 2010</p>
<p>Ahmed Shalaby NCRLab, CEIS, NU</p> <p>Balaji Aresh D&M Research Group, CEIS, NU</p>	<p align="center">Semiconductor Optical Amplifier Gain Characterization for Amplification and Switching</p> <p><i>The use of SOA-based Mach-Zehnder interferometer (SOA-MZI) schemes will overcome the current speed limitation of optoelectronics and allow the processing of packets 'on-the-fly' in future photonic routers. A segmented SOA model scheme for optimizing the key semiconductor optical amplifier (SOA) parameters for amplification and switching functions. In addition to introducing new electrical biasing techniques for the SOA in order to improve the amplification to all input signals for ultra-high speed applications.</i></p> <p align="center">Fundamental Study into the Mechanics of Material Removal in Rock Drilling</p> <p><i>There is a need to understand the mechanics of material removal at the extreme cutting edge in rock drilling in order to design better performing tools. This innovative research by the industrial collaboration between the School of Computing, Engineering and Information Sciences and BIOS Technologies, will produce new knowledge that can be used to characterise the rock/tool interface, using Time Compression Technologies, Small-scale simulation, High Speed Photography and Finite Element Modelling.</i></p>	<p>16 June 2010</p>
<p>Pasist Suwanapingkarl PaWE Research Group, CEIS, NU</p> <p>Ali Almohammad IMLab Research Group, CEIS, NU</p>	<p align="center">Analysis of Voltage and Harmonics Profiles in Future Power Networks</p> <p><i>In future power networks, voltage and harmonic profiles will change due to connection of large number of renewable energy resources (wind turbine, solar panel, etc.) and higher employment of advanced technologies incorporating power electronics (e.g. electric vehicles, high power electronic devices, air condition unit etc.). Accordingly, there is a need to identify power quality problems in medium and low voltage networks of existing networks (passive networks) and anticipated problems in future networks (active and smart networks). This presentation will analyse these issues and some innovative solutions to improve power quality in future networks with the presence of significant distributed generation.</i></p> <p align="center">Formal Analysis and Implementation of real-time embedded systems</p> <p><i>Embedded systems may have high reliability requirements, e.g. a mean time to failure of 10⁹ hours is not unusual. Traditional approaches to testing embedded systems may not alone provide the required confidence in their reliability but can be supplemented by a variety of analytical techniques. One such technique is model-checking.. A major obstacle to the widespread deployment of model-checking in practice is the state explosion problem. This project will investigate approaches to the state explosion problem with a view to improving the applicability of model-checking to industrial practice by using an approach which combines 'design for verification' with software model-checking. Experiments will be conducted in which code will be automatically generated from formally verified models and then new models extracted automatically from the generated code and enhanced using counter-example guided abstraction refinement. It is expected that the results obtained will lead to a better understanding of the practical applicability of these techniques and will support the hypothesis that their use in combination is more effective than the use of either one of them alone.</i></p>	<p>23 June 2010</p>

<p>Rupak Kharel NCRLab, CEIS, NU</p> <p>Panu Pratumnopharat D&M Research Group CEIS, NU</p>	<p style="text-align: center;">Secure Communication using Chaotic Signals</p> <p><i>This talk will focus on the application of chaotic signals in secure communication. Different possible methods and varieties of attack techniques available will be discussed. A possible solution, contribution of my research, will be presented with some key results. The practical implementation of the method will also be discussed.</i></p> <p style="text-align: center;">A software tool for simulation of HAWT</p> <p><i>This software has been designed and developed to predict the performance of horizontal axis wind turbines. The software predicts the rotor mechanical power, the annual average power, power coefficient, torque, and thrust. Aerodynamic forces applied on the blade, as well as the internal forces produced by these forces are calculated in various systems of coordinates, making it possible to link the code with commercial structural analysis software. It is based on the Blade Element Momentum (BEM) theory. The results obtained from this code will be used in the next phase of study.</i></p>	<p>30 June 2010</p>
<p>Dr Paul Vickers & Dr Chris Laing IMLab Research Group, CEIS, NU</p>	<p style="text-align: center;">Network Process Monitoring using the Sonification of a System's Self-organised Criticality</p>	<p>7 July 2010</p>
<p>Dr Krishna Busawon NCRLab, CEIS, NU</p>	<p style="text-align: center;">Mathematical Description of Hybrid Systems</p>	<p>14 July 2010</p>
<p>Prof. Z. Ghassemlooy</p>	<p style="text-align: center;">Research in CEIS</p>	<p>21 July 2010</p>

Note: Presentation time for session with one presentation 30 Mins + 10-15 Q&A for full session. For sessions with two presentations time allocated is 15 Mins + 5 Q&A. For more information and future series contact: Prof. Z Ghassemlooy, email: fary.ghassemlooy@unn.ac.uk